PACIFIC DISCOVERY

50 CENTS

Baja California

CALIFORNIA ACADEMY OF SCIENCES

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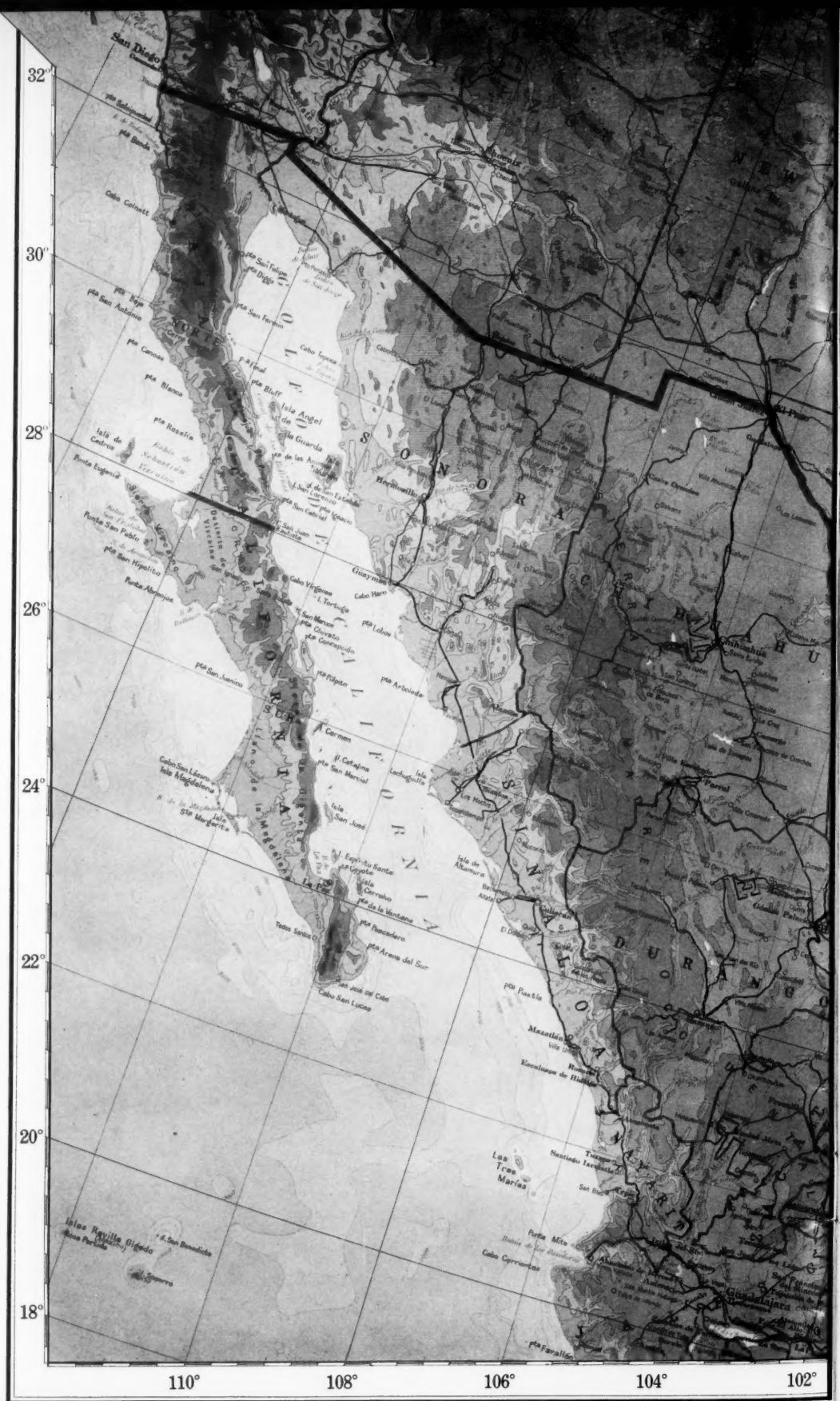

NORTHWESTERN MEXICO

showing Baja California, the Gulf of California, and the Revilla Gigedo Archipelago (not including Clarion Island). Reproduced from the *Map of the Americas* (1948) by courtesy of the publishers, American Geographical Society of New York. (Reduced. Scale of original, 1:5,000,000; elevations in meters; depths in fathoms.)

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A JOURNAL OF NATURE AND MAN **PACIFIC DISCOVERY** IN THE PACIFIC WORLD

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PRE-DISCOVERY

BAJA CALIFORNIA's geographical proximity to Alta California lulled the editorial department into the comfortable belief that it would be easy to get on short notice any number of good photos from which to select some of this issue's illustrations. It was quite otherwise. We especially wanted some air views — more and more tourists are going that way to the peninsula's resorts and sport fishing centers, rather than the long hard way over sand, rock, and mud. Not to go into the long and somewhat fantastic story with a pure chance ending, it took between three and four frustrating weeks to locate a certain former San Diego photographer we had strong reason to believe had what we wanted — that is just the length of time we are late going to press. Needless to say, we tried every other source we could think of, and got some good material along the way; but we are glad we finally got in touch with "Kirk" (or "Pat") Kirkpatrick, now of El Centro. Our only regret is that we could not have used at least two dozen of his uncommonly fine photographs.

From "a cabinet of specimens" in a small office on Clay Street, through a century to the modern museum plant in Golden Gate Park — North American and African halls, the Steinhart Aquarium, the Hall of Sciences, the Morrison Planetarium — the Academy has grown up with San Francisco. "It was on the evening of the fourth of April 1853," said Dr. Robert C. Miller, Academy director, to members of the California Historical Society at their meeting of November 17, 1942, "that seven men picked their way over the cobblestones of one of San Francisco's two newly paved streets to an office at what was then 129 Montgomery Street, to discuss the formation of a society for the promotion of science. . . . Without further delay an organization was effected . . ., a committee was appointed to draw up a constitution, and a name was decided upon, 'The California Academy of Natural Sciences.' " In April 1953 the California Academy of Sciences will begin official celebration of its centennial, with special exhibits, meetings, lectures, and, of course, a Centennial Issue of *Pacific Discovery*, the March-April.

DISCOVERING PD'S AUTHORS

BESIDES those of **G. E. Kirkpatrick**, mentioned above, we acknowledge the contributions of **Neal R. Harlow**, Librarian of the University of British Columbia, and **Ormal I. Sprungman** of San Diego, who came through on short notice with generous selections of good photographs, far more than space allowed. . . .

¶ **William C. Massey** of the University of Washington's anthropology department reviews Baja California from 12 years of research on its geography, history, and anthropology. He goes south again next summer as director of the North Mexican Center for Anthropology, at La Paz, a joint Mexican Government–U. of W. venture. . . . ¶ Wherever you may be in Baja California, you are but a few miles from the Gulf of California's famous fishing waters. **Laurence M. Huey**, the naturalist who tells of folk who fish not for sport but for a living, is curator of birds and mammals in the San Diego Natural History Museum; and **Dr. Robert T. Orr**, who searched for bats that fish in the Gulf, is curator of birds and mammals in the Academy. His penchant for bats does not necessarily show a vacillating nature. . . . ¶ Government horticulturist **Roy W. Nixon** has visited date gardens, in Baja California and in the Old World, centuries older than his U. S. Date Garden at Indio, California, where the Agricultural Research Administration works for the benefit of our big American date industry. . . . ¶ **Dr. Robert S. Dietz**, scientist in the Navy Electronics Laboratory at San Diego whose report on the San Benedicto eruption we have adapted with his permission, is now at the University of Tokyo as a Fulbright Scholar in oceanography. . . . ¶ **Dr. Joel W. Hedgpeth's** qualifications to deal with Steinbeck and Ricketts are mentioned in our own comments on *Between Pacific Tides* (REVIEWS, page 31). D.G.K.

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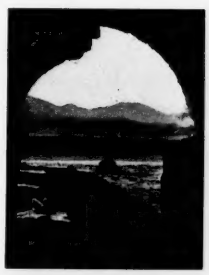

THE COVER COPY

ACCORDING to the photographer, G. E. Kirkpatrick of El Centro, California, this is Baja California as seen through the door of an abandoned mission school somewhere between Ensenada and Santo Tomas.

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WILLIAM C. MASSEY

Baja California in Review

BAJA CALIFORNIA means many things to many people. To those who chance along the International Border, it means a taste of Mexico in Tijuana, Mexicali, or Ensenada, all close at hand over excellent highways. To sport fishermen it means taut lines on the calm blue waters of San Felipe, or, farther afield, on the bays at Loreto or La Paz. To commercial interests it may mean the winter tomato crop of the southern Cape District, or the fishing grounds of the Pacific and Gulf coasts. But to scientists – zoölogists, botanists, entomologists, anthropologists – and to historians and geographers, it is a land of important and treasured rewards in their unique fields.

For centuries the peninsula has exerted these attractions. The Spaniards of the 16th century were lured by the wealth of the Gulf pearling grounds; Hernán Cortés himself spent a while in California at Bahia de la Paz in 1535 with his unsuccessful colony. The missionaries of Spain realized their vision of an enduring chain of missions stretching into the heathendom of the aboriginal peninsula. Gold and silver prospectors of subsequent centuries searched through the mountains; some were lucky, some not. But perhaps the greatest attractions and the most bountiful gifts of this fabulous land have been to the field of scientists who have painstakingly sought out its secrets. What is the story, and what is the lure of this tongue of desert stretching into the Pacific from North America?

The peninsula of Baja California is an 800-mile long strip of land, pendant from the northern mainland, and separated from the Mexican coast by the trough of the Gulf of California. Curiously these facts were not fully accepted until 1746, late in the Spanish occupation of the region. For over 200 years a controversy raged among European map-makers over the geographic status of California. Despite the coasting voyage of Ulloa in 1539, and the Gulf voyage of Padre Ugarte, it was not until the survey voyage of Padre Consag to the mouth of the Colorado River in 1746 that the disputants were convinced that Baja California was a peninsula and not an island.

Connected to North America, and close to the west coast of Mexico, Baja California partakes in many ways of the characteristics of both. Granitic mountain ranges enter the peninsula from beyond the International Border in California. These lofty mountains, attaining elevations of over 10,000 feet in the Sierra San Pedro Mártir, hug the eastern edge of the peninsula for over a third of its length. They disappear under the lavas of the central ranges which also lie on the Gulf side. There extensive sheet flows of lava have spread from east of the peninsula obscuring the older topography in a nightmare of igneous landscape. The sharply pinnacled skyline of the Sierra de La Giganta behind Loreto has such an origin, as do the spring-fed canyons of San Ignacio and Comondú. Here and there, particularly in the northern reaches of the lavas, symmetrical cones are puffed up above the lavas; largest of these are the Tres Vírgenes outside of Santa Rosalia. Apparently unconnected with this vulcanism is an isolated group of cones many miles to the northwest at Bahia de San Quintín.

South of the Sierra de la Giganta lies the low, 30-mile wide waist of the peninsula west of La Paz. This gap between the Giganta and the mountains of the Cape region is the only east-west passage in the entire length of Baja California. Beyond the gap, to the south, is the deeply eroded pile of the granitic Sierra de la Laguna which dips dramatically into the Pacific at Cape San Lucas.

Everywhere there are lesser hills and mountains which break and vary the landscape. In the Cape region there is the isolated Sierra de La Trinidad to the east of San José del Cabo; east of La Paz are the high rounded peaks of the Cacachilas; and the barren wastes of the Vizcaíno Desert hold the peaks known as the Sierra de Santa Clara. Nor is the geological composition of the peninsula uniformly simple; west of the mountainous backbone are compacted marine sediments of past geologic epochs. These evidences of times when the ocean covered most of Baja California are readily seen along the Pacific coast south of Bahia de San Quintín. The geological past is evident again in the bones of great mammoths which erode from arroyos near La Paz. These attractions are a lodestone to the scientist, and draw the casual observer.

This slender land extends south from southern California to just beyond the Tropic of Cancer. Its climates reflect this extension, although, generally speaking, it is an arid land. The northern third of the peninsula lying close to California has scant winter rains; the south reverses this condition with rains in the late summer. The central peninsula suffers from heat and from want of rain because it lies on the fringe of the two rain systems. Aridity is the rule; it is strengthened by alongshore winds of the Pacific which bring only fogs to the west coast.

The desert vegetation of the peninsula delights the traveler and the botanist by its variety and astonishing forms. Only in the higher mountains such as the Sierra San Pedro Mártir in the north, or the Sierra de la Laguna in the south, does one encounter the tem-

perate oaks and pines. Along the foggy west coast the mescal *(Agave* sp.) is prolific and prominent. One well remembers the candelabra blooms and spiky leaves of these plants on terraces and hill slopes. The Indians found their starchy buds an important baked food.

The northern reaches of central Baja California hold two of the unique trees of the world. The cirio *(Idria columnaris)* grows to heights of over twenty feet in a single tapering column topped by a froth of yellow flowers. Days of familiarity are required before one accepts this strange plant with its two-inch branches on the towering, or curling, trunk. They appear as forests of telephone poles. The landscape which they grace recalls some dim forgotten age. A frequent companion of the cirio in these north-central deserts is the contrasting, squat elephant tree *(Pachycormus discolor).* This tree, about twelve feet in height, is peculiar for the gross appearance of its folded and creased tapering trunk and branches. The wood is pulpy, and the bark like tissue paper. Defenseless for lack of spines, it serves no use to man or animal.

Central Baja California, save for the barren parts of the lava uplands, sports a thorn forest of which the typical plants are the yuccas *(Yucca valida),* giant cactus *(Pachycereus* sp.), ocotillo *(Fouquieria* sp.), chollas *(Opuntia cholla)* and related species and a multitude of other desert forms which are found in varying quantities throughout the peninsula. Certain areas of this section of Baja California support jungles of particular types of plants; as, for example, the Vizcaíno Desert with its forests of yuccas; or the south end of Bahia de la Concepción with its magnificent growths of cardón *(Pachycereus pringlei).*

The southern Cape region, lying south of La Paz, contrasts with other vegetation areas in the abundance of burseras, especially of the torote *(Bursera* sp.), and of euphorbias, of which the lomboi *(Jatropha* sp.) is prominent. The canyons and arroyos have palm-lined pools of water with Cape cottonwoods, the gueribos, *(Lysiloma candida)* growing on the slopes of the mountains. The pitahaya *(Lemairocereus thurberi),* found through the entire south half of Baja California, grows abundantly on the southern hills. Its fruit is as justly esteemed today as in the days of the Indians. Much of the vegetation of the Cape re-

▲ The highest peaks of the Sierra San Pedro Mártir are the summit of Baja California, over 10,000 feet. San Pedro Mártir's pine forests are virtually the only timber on the peninsula. (G. E. Kirkpatrick)

gion bears pointed comparison to that of the adjacent mainland of Mexico, across the Gulf of California. It stresses the peculiar flavor of Baja California which in most natural and cultural aspects mirrors currents of influence from the north as well as from trans-Gulf Mexico.

The fauna of the peninsula clearly derives from the north. The arid regions of North America support similar forms of birds, reptiles, and mammals. There are minor zoölogical distinctions which are most emphatic in the Cape region and the adjoining islands.

The unusual features of the landscape of Baja California increase as one moves southward; the Cape region is in many ways outstanding. This is as true of the native Indian cultures as it is of the plants and animals. Virtually all that we know about the Indian groups of the peninsula comes from the reports and diaries of the Jesuit missionaries who occupied and civilized Baja California during the 17th and 18th centuries. At present there are Indians living only in the extreme north of the Peninsula in the mountains to the east and southeast of Ensenada. In the 17th century, however, before introduced diseases decimated them, there were tribes of Indians living throughout the peninsula.

Those nearest to California were related by language and custom to the tribes of southern California and the Colorado River. The Guaicura, Cora, Pericu, and other groups living to the south beyond Loreto contrasted strongly in language and implements with the northern tribes. In other words the south of Baja California again takes on an isolated and island-like character.

All of the aborigines lived by hunting, fishing, and by collecting the wild fruits, seeds, and berries which the plants afford. The Indians were in small groups which wandered over their own territories. Frequently the great accumulations of shells, which mark their coastal habitations, can be seen along the shores. They knew nothing of agriculture, nor of pottery-making. They were far from uniform in their customs or equipment; for example, the Indians of the Cape region only speared fish, while the Indians of central and northern Baja California netted and caught fish with hook and line. There are many types of tools, and even of social and religious customs, which

Wherever there is water, Baja California's valleys are intensively cultivated. This is an air view of El Rosario, a fertile arroyo on the northwest coast. (G. E. Kirkpatrick)

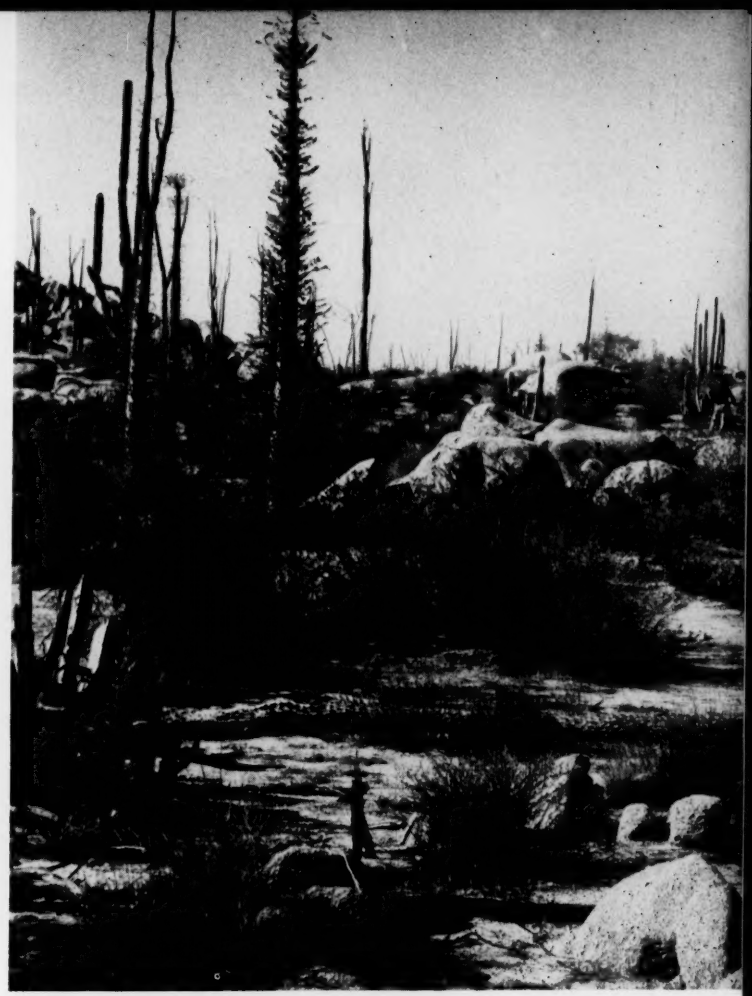
mark various sections of the peninsula as very distinctive areas. These are being unravelled by a search of the Spanish documents, and by the spade of the archeologist.

Such, then, was Baja California when a ship of a small fleet sent north by Hernán Cortés chanced on the southeastern corner of the great peninsula late in the year 1533. This opportune discovery, shortly after the Conquest of Mexico in 1521, opened new vistas to the Spanish as they moved northward seeking riches in fabled Cíbola, California, or the land of the Amazons. Numerous were the colonizing ventures of private persons who sought to occupy the Gulf coast for Spain. This was particularly urgent after the English pirate, Thomas Cavendish, captured the Manila galleon off Cape San Lucas in 1586. But neither colonists nor pearl-fishers could gain a firm footing on the peninsula. As a final resort the area was turned over to the Jesuit missionary order, pioneers in the Sierra Madre of Mexico.

Even before the formal inauguration of Jesuit activity one of their company, Father Eusebio Francisco Kino, founded an unsuccessful mission at San Bruno, about fifteen miles north of Loreto, in 1683. Although this expedition, financed by the Spanish government, failed, it did draw attention away from Bahia de la Paz which had been the site of many a disastrous colony from Cortés' time onward. The first permanent settlement in Baja California was founded in 1697 by Father Salvatierra at Loreto. This small village barely squeezed between the Gulf and the towering range of La Giganta, has changed little from mission times until it recently became an attraction for air-borne tourists.

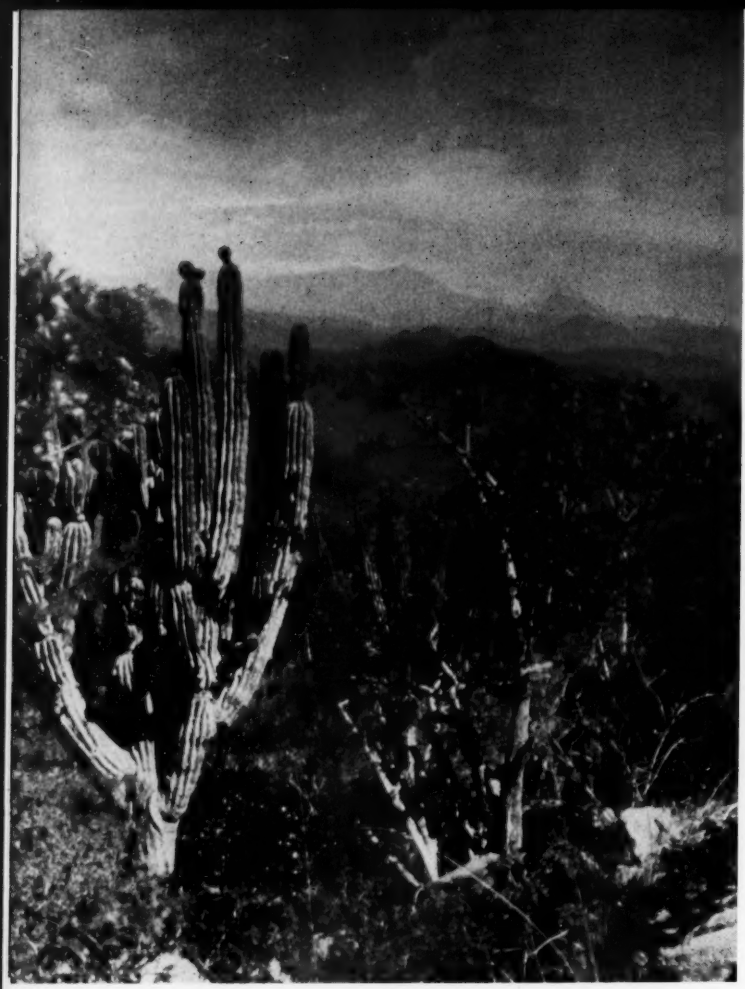
These were magic days in the history of the West, when, from the tiny beginning at Loreto, Salvatierra and his growing band of priests worked north and south erecting missions along the nearby coast and in the mountain valleys. There was San Xavier in 1699, and San Juan Bautista de Malibat in 1705; Mulegé in 1705, and Comondú in 1708. The Fathers were intrepid, hardworking, and conscientious. There were Mayorga and Basaldua, and always there were Ugarte and Pícolo whose Christian activities were matched by their tireless trips across the peninsula to survey the Pacific Coast for a harbor – never found – for the galleons coming from Manila to Acapulco. Schools, hospitals, and productive agriculture and stock-raising were introduced.

It was not until 1720 that the Jesuits were ready for the occupation of La Paz. In November of 1720 La Paz Mission arose on the arroyo where La Paz now stands. The southward extension of the mission chain reached Santiago in 1728, and San José del Cabo in 1730. Dark days lay ahead, for the priests were in the Cape region, home of the troublesome Cora and Pericu Indians. The isolated group of missions on the east of the Sierra de la Laguna were overwhelmed in 1734 by a savage massacre in which Fathers Carranco and Tamaral were martyred. The neighboring Guiacura to the north took up the torch of rebellion, and the whole Jesuit adventure was threatened until 1736 when the Indians were quelled by force.



The expansion of the missions into the northern deserts did not occur until 1752. Much earlier San Ignacio had been established as a prosperous settlement on the banks of a spring-fed stream. It stood as the frontier mission from the time of its foundation in 1728 until Santa Gertrudis Mission moved the frontier northward in 1752. All of the foundations to the north were the result of diligent heart-breaking search by the Jesuit Fathers, who were acting on royal orders to link their California missions with those advancing through Sonora. The abrupt secret orders of Charles III in 1767, expelling the Jesuits from the New World, halted this northern expansion at Mission Santa Maria, about 200 miles south of the present International Border. The Jesuit explorers had ac-

Tall, ragged spikes of the cirio dominate the granite-bouldered plain to the north of the Vizcaíno Desert, in Baja California's arid but not barren midsection. (G. E. Kirkpatrick)



Subtropical lushness of growth marks the mountainous Cape Region. (E. S. Ross)

complished even more; by their treks through the north of the peninsula they had broken the trail that was to be followed by the Portolá Expedition two years later. Loreto, which had become the symbol of their success, saw the last of the Jesuits embark in 1768. Fifteen of their members lay buried in the baking earth. But twenty-two missions, cattle, agriculture, viniculture, date gardens, all the treasures of Baja California are a heritage from these missionaries.

On the other hand the occupation had been a harvest of death — death for the thousands of Indians from crowding and disease — and the Franciscans briefly, and then the Dominicans reaped that harvest. Baja California was eclipsed and drained by the more fruitful missionary field and the strategic importance of Alta California. Almost immediately after the expulsion of the Jesuits the Spanish government ordered the occupation of the far north to save the valuable coast from alien powers. The Portolá Expedition left Loreto in 1769 on the trek which ultimately led to the establishment of the California missions and to the discovery of San Francisco Bay.

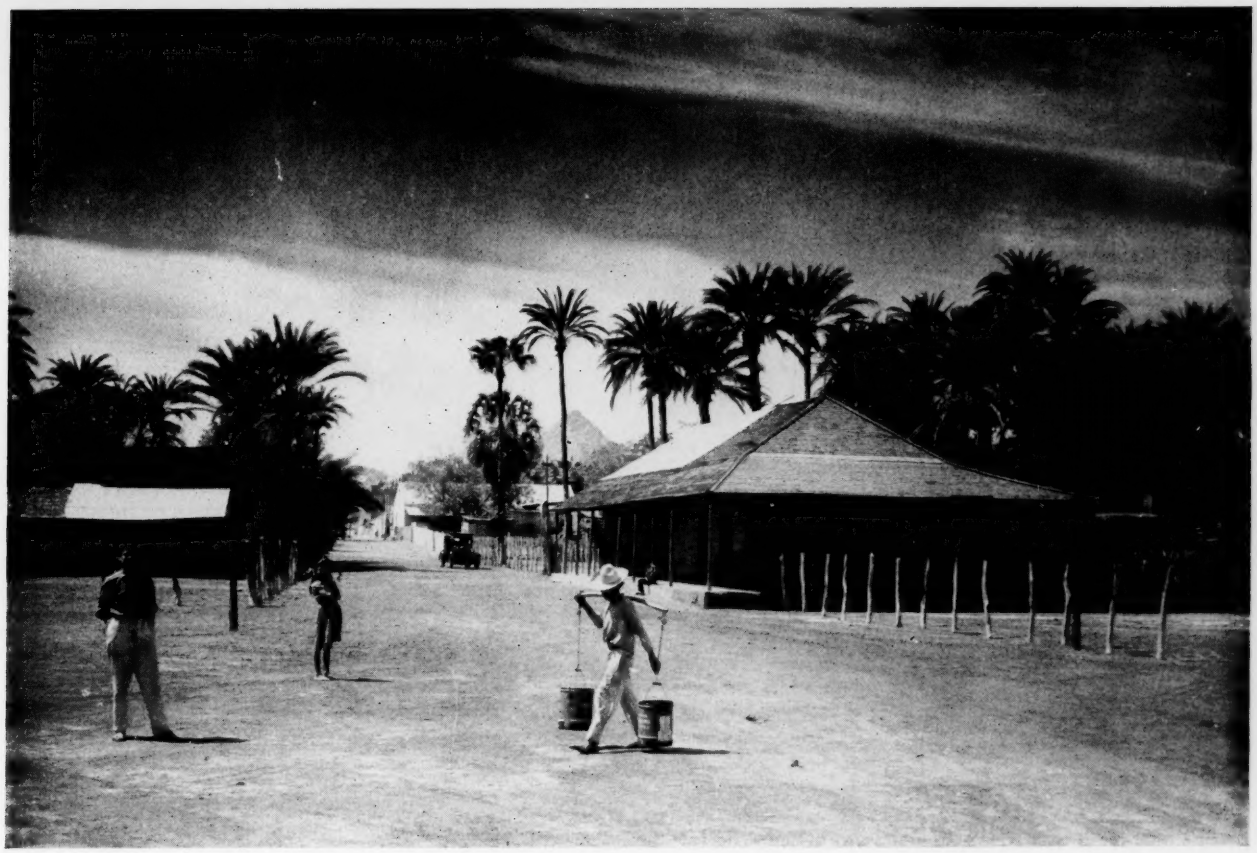
In turn Baja California fell in 1772 to the Dominican Order which labored in the untamed area lying between San Diego and the only Franciscan mission on the peninsula at San Fernando Velicatá. Not only did the Dominican Fathers lay the basis for the later developments in the region around present Ensenada and Tijuana, but they administered the failing older missions of the peninsula, now bereft of natives. The peninsula with its capital at Loreto fell under civil control.

The tumult and clash of arms in Napoleonic Europe, and the subsequent revolt of Mexico, barely reached the peninsula save to emphasize its backwater position.

While independent Mexico, as heir to the Spanish Empire in North America, strove to maintain its political and economic existence, it was rent by the tragicomic antics of Lopez de Santa Anna. The Texas question simmered and boiled. "Santy Anny" and the Texans moved the United States and Mexico closer to the inevitable war of 1845. The quiet port of San José del Cabo was startled on March 29, 1847 when the *Portsmouth* under Commander Montgomery anchored in the roadstead. Although the initial raising of the American flag was without incident, the New York Volunteers who were landed at La Paz soon found that the occupation would not be a docile affair. The guerrilla bands of the south harassed the Americans and fought pitched battles in La Paz and San José del Cabo. A street in La Paz still honors José Mijares, a hero who fell at San José.

The Peace of Guadalupe Hidalgo in 1848 brought little respite to the peninsula, for American miners were pouring into California after gold. Many were diverted from California into the old gold-fields of San Antonio near La Paz, and to the newer mines at Calmalli in central Baja California. When the Gold Rush spent its fury in California, the peninsula and the rest of northern Mexico were visited by a plague of filibusterers — spawn of the boredom and lawlessness of California in the '50s. Most famous of these was the Tennessee doctor, William Walker, who dreamt of a republic of Lower California and Sonora. His brief and ruthless career in Baja California accomplished little but destruction. He did lay the foundations for the town of Ensenada, a site which had not attracted the missionaries because of the scarcity of water.

With the end of the filibustering era, Baja California slipped out of the pages of history into peaceful oblivion. From time to time it was a pawn sought and declined on the diplomatic tables of the world of Napoleon III, Maximilian, and Juarez. Following the expulsion of the French from Mexico, the new and perennial president, Porfirio Díaz, allowed great mining and colonizing companies to partition the peninsula. The aridity of the deserts and the geographical



position of Baja California made mockery of most of the schemes. Remnants of these enterprises still dot the peninsula: a rusting rail at San Quintín, a smelter stack at El Triunfo, the monotonous shacks of copper-miners at Santa Rosalia.

A new epoch has arrived for Baja California. The northern half of the peninsula has been proclaimed a state in the Mexican Republic. The increase in population, stimulated at first by American Prohibition, now rests on the commerce of the border towns, and the agricultural riches of the Valley of Mexicali.

While the southern territory has not received the population boom of the north, yet it too is changing under the economic benefits of tourism and agricultural and business enterprise. The echoes of the airplane's motors sound among the walls of abandoned missions, across the thorn deserts, and along the matchless coasts. Isolation and self-sufficiency are falling before modern communications and clamor for the novelty of a vacation in Mexico. END

FOR FOLLOW-UP READING:

BAEGERT, JOHANN JAKOB. *Observations in Lower California* (1772). University of California Press, Berkeley and Los Angeles. 1952. (*See* REVIEWS.)

BEAL, CARL HUGH. *Reconnaissance of the Geology and Oil Possibilities of Baja California, Mexico.* Memoir 31, Geological Society of America. 1949. A fine summary of present knowledge of Baja California's geology.

CLAVIGERO, FRANCISCO JAVIER, S.J. *The History of [Lower] California* (1789). Translated by Sara E. Lake and A. A. Gray. Stanford University Press, Stanford. 1937. A contemporary history of the Jesuits in Baja California.

DUNNE, PETER MASTEN, S.J. *Black Robes in Lower California.* University of California Press, Berkeley and Los Angeles. 1952. (*See* REVIEWS.)

FIERRO BLANCO, ANTONIO DE. *The Journey of the Flame.* The Literary Guild, New York. 1933. This mixture of historical fact and fiction carries more of the flavor of Spanish Baja California than a dozen histories.

ENGELHARDT, ZEPHYRIN, O.F.M. *The Missions and Missionaries of California.* 4 vols. Mission Santa Barbara, California. New edition 1929. Vol. 1, Lower California, deals at length with the Franciscan and Dominican periods, as well as with early voyages and discoveries and the Jesuits.

NELSON, EDWARD W. *Lower California and Its Natural Resources.* Memoirs of the National Academy of Sciences, vol. XVI. Government Printing Office, Washington, D.C. 1921. After thirty years this is still the best survey of the biology of Baja California, and a good travel account.

Loreto's chief distinction is that here in 1697 was founded the first permanent Spanish settlement in Baja California. (Ormal I. Sprungman)

Fisher Folk of the Sea of Cortés

LAURENCE M. HUEY

GLANCING at the map of North America, one is immediately impressed by the long narrow body of water that lies in the northwestern section of the Republic of Mexico. This is now known as the Gulf of California – yet to some of those who live beside its tepid waters it still retains its olden name, the "Sea of Cortés."

In ages past this inland sea extended much farther north into the desert regions of Southern California. The turbulent Colorado River used this northern portion as a dumping ground when it dug the world's mightiest canyon, leaving a great area far below the level of the sea and an arid desert delta that has been converted into one of the finest and most intensified agricultural regions on earth, Imperial Valley.

Offering no wealth to the early explorers, this region was little used until the great California gold rush of 1850 when attempts were made to carry supplies by water to the United States forts along the Colorado.

The Ives exploration of the Colorado River by steamboat in 1857 wrote another chapter in the slowly shaping history of this little-known region. The charting of these waters by the U.S. Ships *Narragansett, Ranger,* and *Thetis* between 1875 and 1897 gave the world a correct outline of the coast, while the splendid work of the U.S. Fisheries Steamer *Albatross,* designed by the great naturalist Spencer F. Baird for deep-sea oceanographic survey, added much to the annals of science, and from the collections made scientists

▲ San Felipe on the east coast of Baja California has grown considerably since the author first saw totuava caught there a quarter century ago. (G. E. Kirkpatrick)

gave names to the fish that were later to be exploited in this area. Chief among many very delectable table fish found in these waters is a large weakfish, the largest, in fact, of a species known on both the Atlantic and Pacific coasts, the females of this Gulf form sometimes weighing 175 pounds. To the scientific men it is known as *Cynoscion macdonaldi;* native fishermen have two names for it: the female is called *totuava,* while the much smaller male is *machurro.* The former is the more important and most highly sought, for not only does it have the greater weight of marketable flesh but the swim bladder or sound is a delicacy to the Chinese and commands a high price.

While the flesh of this large fish has reached the American table only within the last two decades, it has long been prized by Mexicans at Guaymas and other Gulf towns. It is a strange paradox, however, that the business of supplying a very small local market to the insatiable demands of a winter supply for multitudes should have arisen from the Chinese taste for glutinous soups. Such was the case, nevertheless, for years ago an enterprising Chinese merchant saw in the dried sound or swim bladder from totuava a resemblance to that highly prized and very expensive product from a fish of oriental origin, so he gathered together a small shipment which was sent to China. The response was immediate, and as a result the waters about Guaymas were almost depleted in a few years. So valuable were these swim bladders or "Buche," as the fishermen call them, that the fish were caught for this product alone; untold tons of edible flesh were thrown away.

The depletion of the fisheries about Guaymas spurred the more adventurous to seek other grounds. Six German deserters from sailing ships who were interned during World War I at Santa Rosalia on the Baja California side of the Gulf, and who were then fishing for a meager living, paddled up to the headwaters of the Gulf and finally found conditions at San Felipe, on the Baja California side, ideal for their needs.

Like many named places in the remote desert regions of Mexico, San Felipe was only a watering place without human habitation. A small supply of drinkable water could be had by digging a few feet below the surface back of the beach line. The desert supplied a few ocotillos and ironwood trees from which fishermen made rude shelters to protect them from the desert sun. Rain or inclement weather was the exception during winter and spring months. The six Germans had a very successful season and when they arrived back in Guaymas with as much valuable "Buche" as their frail canoes would carry, the greater part of the fishing population hied to San Felipe the following season.

It was a heterogeneous group that paddled and sailed their dugout canoes up along the eastern shores of the Gulf and around the northern end to San Felipe, camping each night on shore or stopping over when the wind made the water unsafe for the frail boats.

Yaquis, tall and handsome, some Papagos, much shorter, and the usual lot of nondescripts found along the waterfront at Guaymas made the trip, their wives and children, chickens, dogs and cats, all accompanying. Upon arrival, they soon had their brush houses erected and started to fish in earnest. The man caught the fish while it fell to the woman, if he had a wife, to clean and prepare the "Buche."

Their needs were few—sugar, coffee, flour, lard, and beans with such fish as they cared to prepare kept body and soul together. There was no need for money—the golden dream was to follow when the season's crop of "Buche" was sold on their return to Guaymas and then came the orgy of nicknacks and fol-de-rols for the women and a variety of diversions for the men.

Two American fishermen, who had braved 136 miles of desert waste over new trails to enjoy their favorite sport, brought back a couple of fresh fish to Calexico during the winter of 1933. This, with reports of the prodigious waste, started the present-day, well organized, winter, fresh fish industry.

The possibility of reaching San Felipe overland by motor assured, two truckmen with light trucks ventured forth; and knowing well what arid desert breakdowns meant, for tortuous desert trails were part of their everyday life, they loaded their machines with ample fuel and water for the round trip. Their arrival at San Felipe, 136 miles south of the boundary, was phenomenal to the fishermen, and the truckmen had no trouble loading their trucks with totuava at ten centavos a fish, or a hundred-pound fish for five cents American money! Their safe return to the boundary and American markets was no less remarkable, and their profits were startling. Such news spread rapidly and soon many adventurous truckmen, both American and Mexican, were San Felipe-bound.

The first season after the sportsmen broke the trail, 171,000 pounds of fish reached the border.

At the fishing village, sharp practice on the part of the fish buyers taught the fishermen much. The deals were soon "cash on the spot" and competition for full loads between the many truckmen ran high. It was truly a business of "every man for himself." The winter market demands were increasing as stormy conditions during this season on the Pacific always curtailed production of other kinds of fresh fish and the quality of totuava, known to the American trade as sea bass or Mexican bass, was finding untold favor. During the early years of the industry, Calexico was the only point of entry for totuava and at this point most of the fish were refrigerated and shipped either by transport truck or railway express to San Pedro, California, for redistribution to the trade.

These conditions prevailed when I first visited San Felipe in 1926, a few years after the traffic in totuava had had its inception. The German fishermen were present and I made friends with them, little knowing that in the years to follow the acquaintance would be renewed at intervals and at increasingly remote places as the greater demands made on the fisheries would impel the fishermen to search for better fishing grounds.

The further expansion of the totuava fisheries moved south along the Sonoran side of the Gulf, yearly. Punta Peñascosa (Puerto Peñasco), Punta Lobos, and lastly Bahia Kino, all resulted from greater demands for fish and road improvements.

The fishing camp of Punta Peñascosa, or Rocky Point, has its outlet at Sonoyta and Ajo on the International boundary and was one of the most inaccessible camps on the Gulf. It is situated near a rocky headland from which it gets its name; a more inhospitable place cannot be imagined for human habitation. Neither wood nor drinkable water are to be found within a radius of 20 miles and both these necessities have to be brought in. Much spirited bargaining usually follows the ar-

▲ The fish are brought ashore and cleaned, then just before delivery to the trucks waiting back of the beach they are dipped back in the sea to remove all sand and blood. Two of the huge totuava strung on an oar make a heavy load. (Laurence M. Huey)

rival of a new supply. This breaks the camp's monotony, however, and is always most friendly. As at San Felipe, a good road has been built to Punta Peñascosa and a fairly large winter tourist trade now exists. Peñascosa can boast of a railroad too for a line has been driven in from Mexicali in Baja California and motor-driven flat cars come in with some regularity, easing the supply situation greatly.

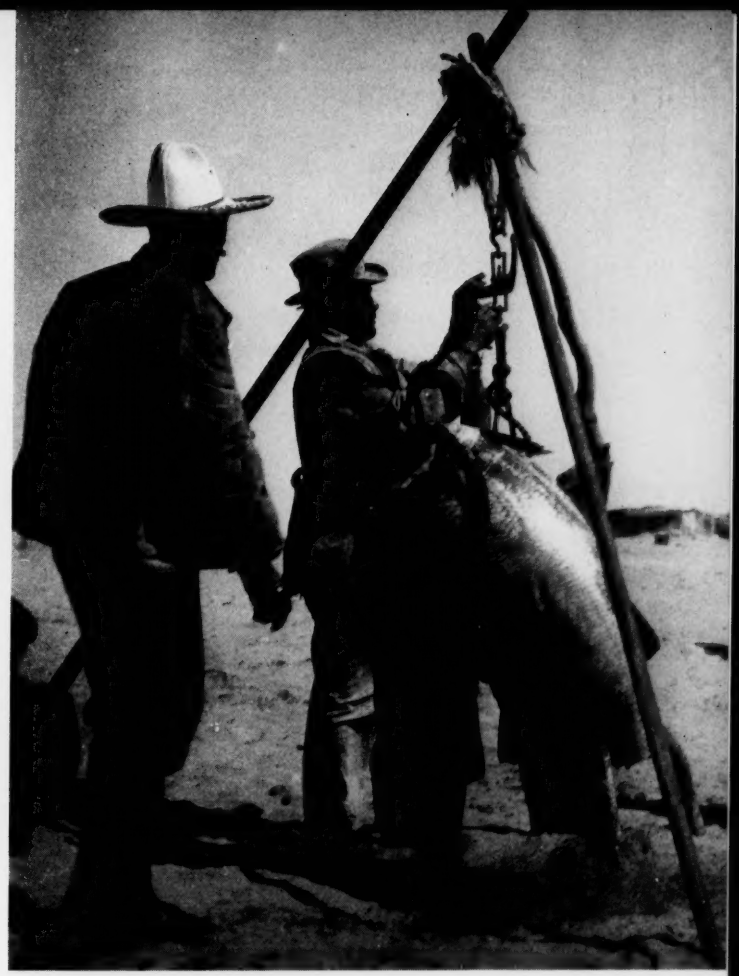
It was at this camp after eighteen hours of travel, six of which were spent wrestling the truck through a 12-mile sand barrier, that I again saw my German friend, Fritz. I asked about his partners. Four had fallen victims to the sea, one had become disheartened and left. Two years before, a sudden squall had capsized an overladen canoe from which three of them were fishing, and two were drowned. Their remains fill lonesome graves on a headland south of Santa Clara.

The other two had lost their lives on an errand of mercy but three months earlier. The season had been exceptionally windy, which stopped fishing and filled the road with drifting sand to make travel almost impossible. A month passed without the arrival of a single truck. The water supply of the village became exhausted so four men set out down the coast where, thirty-five miles south, fresh water could be obtained near the beach.

A week of strong winds followed without their return so Fritz and his two companions volunteered to hunt for them, setting out early in the morning. The wind freshened with the rising sun, their boat swamped and Fritz was the only one left to tell the tale. Such was his story.

Our collection of birds, mammals, and reptiles always occasioned many visits from the villagers and as a rule the whole population one by one would drop in upon us. A mouse trap given to a small boy gave him a great deal of pleasure and resulted in the application by most of the rest, young and old, for a similar present. Many times we were asked for medicine. These isolated camps, far from the service of a doctor, had their human ailments and at times the poor victims suffered agonies. Aching teeth, colds, or wounds contracted in fishing were the most prevalent ills. Several times during my visits in the different camps I heard of the birth of children.

"And what do the womenfolk do in these fishing camps?" I've been asked. The answer is always the same – the household toils, preparing meals, with added burdens depending on the locality of the camp. These always included the cleaning of the "Buche" and the washing of the clothes.

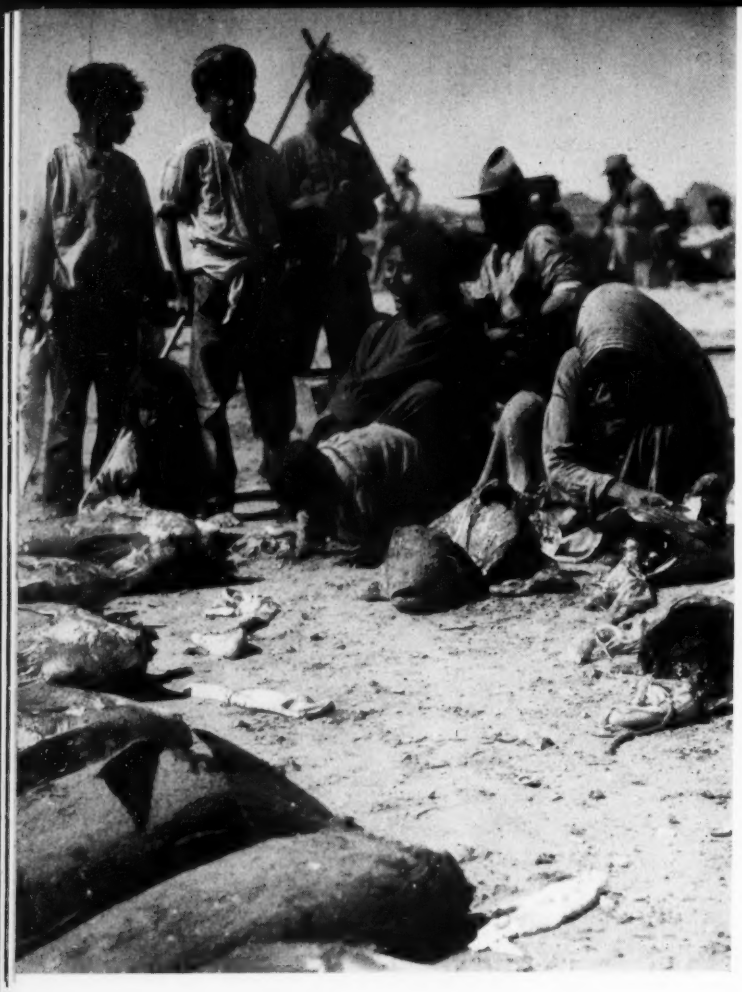


During 1935 Bahia Kino, one of the latest camps to start fishing though the farthest station from winter markets to the northward, closely contested the old camp of San Felipe for the record of quantity shipped. This was due to an improved highway the Mexican Government was building south from Nogales on the boundary. Over this route larger, faster trucks were being used. They had insulated bodies and were carrying ice, greatly improving the quality of the fish when they were delivered at the distribution centers.

Trucks loaded at Bahio Kino were bound for Tucson, Arizona, San Pedro, California and in some cases Omaha, Nebraska, over 1,800 miles distant, with no stops en route.

Likewise a drastic change had taken place since 1926 in respect to obtaining loads. The fishermen had organized, the truckmen also, and the Mexican Government had representatives on the beach

After cleaning, the fish are weighed on the steelyard, then taken to the loading platform where the fishermen are at last paid for their toil. (Huey)



to oversee the weighing so that there were fewer irregularities in the collection of duties. Manifests of the cargoes were issued not unlike those used by fishing boats on the Pacific Coast. A price for the fish was made according to the market demands and the catches were booked ahead for deliveries. Instead of each fisherman selling his own catch they were pooled, each man receiving payment according to the weight of fish he caught. A uniform cleanliness and a designated place of delivery were demanded of the fishermen by the truckmen. This facilitated shipment and as the trucks were loaded in the order of their arrival at the beach there was no loss of fish waiting for full cargoes.

During the decades this totuava fishery has been rising from a small local industry to the business of supplying a great winter trade spreading over a large part of the Southwest, some methods of handling have kept pace with the growth of the market. Yet when the beach is reached the ultra modern meets the primitive — another paradox, for a greater part of the totuava are caught by men using hand lines from dugout canoes. This system seems to work best. However, there has been a single innovation since I first saw totuava caught at San Felipe in 1926 — the use of dynamite. This situation seemed a bit alarming but I learned that only very small squibs were discharged to stun the sardines. This in turn would attract totuava, making them bite more readily. Be that as it may, it only hastens the depletion of the fish in any locality and sooner or later will work havoc on the industry.

Life at Bahia Kino is as I had seen it in the other camps. At sunset these fisherfolk assemble in small groups near the sheltered side of their huts where they smoke and discuss the happenings of the day. Often on quiet evenings, to the tinkling accompaniment of a guitar, several well blended voices join in quaint folk songs that are strange to the American ear but have a melodic fascination that appeals to the innermost sense. Should there perchance be a comely maiden in the camp one might be awakened by her swain serenading her during the midnight hours. Frequently a troupe of musicians comes into camp and a dance is held.

It is not unusual to hear these fishermen singing their folk songs, to the time of their paddle strokes, as they leave the beach for the fishing grounds at early dawn.

Light of heart, they venture forth in their frail craft though no one knows whether they will ever return. Death stalks always in the wake of the seafarer, be he sailor or fisherman. Fisherfolk of the Gulf of California are no exception for the suddenness of a storm on these glassy waters is another way of Mother Nature. Such a scene transpired at Bahia Kino during the writer's visit. A half dozen trucks came in one night and at daybreak every available craft set forth for the fishing grounds over a glassy, smcoth sea. The fish bit well and by noontime the frail craft were well laden. Suddenly a boisterous wind sprang up from the north and the smooth surface of the sea was churned to a mass of choppy white caps. All of the fishermen up-anchored and started for home. One canoe, smaller than the rest, was over-burdened with three men and a catch of about twenty large totuava. Made very unseaworthy with this load, the craft swamped and carried her three fishermen to watery graves. Next morning when the

When the fish are landed small boys chop the heads off for the "Buche" and take that delicacy home for their mothers to clean and dry. One of these three *muchachos* holds a large "Buche." Seri women pounce eagerly upon the abandoned heads to cut out the large cheek muscles — excellent meat, prized by the Indians. (Huey)

storm had quieted the wooden canoe and one lifeless body were stranded high upon the beach, the other two were never found. Tragedy strikes often.

When the fishermen established their camp at Bahia Kino they found another people living in this region – the Seri Indians. These Indians had always lived by the sea, subsisting on such food products as the sea had to give and though reluctant at first to enter into the fisherman's ways of living, gradually they learned to work and enjoy some of the fruits of labor. Already, like most Indians, they had a keen intelligence for bartering, were very adept at thievery, and had an insatiable love of gambling. They lived apart from the fishermen's village, building themselves rude shelters, little more than waist high, of native shrubs. They cast their fish heads and other debris all about, making a filthy litter covered with multitudes of flies.

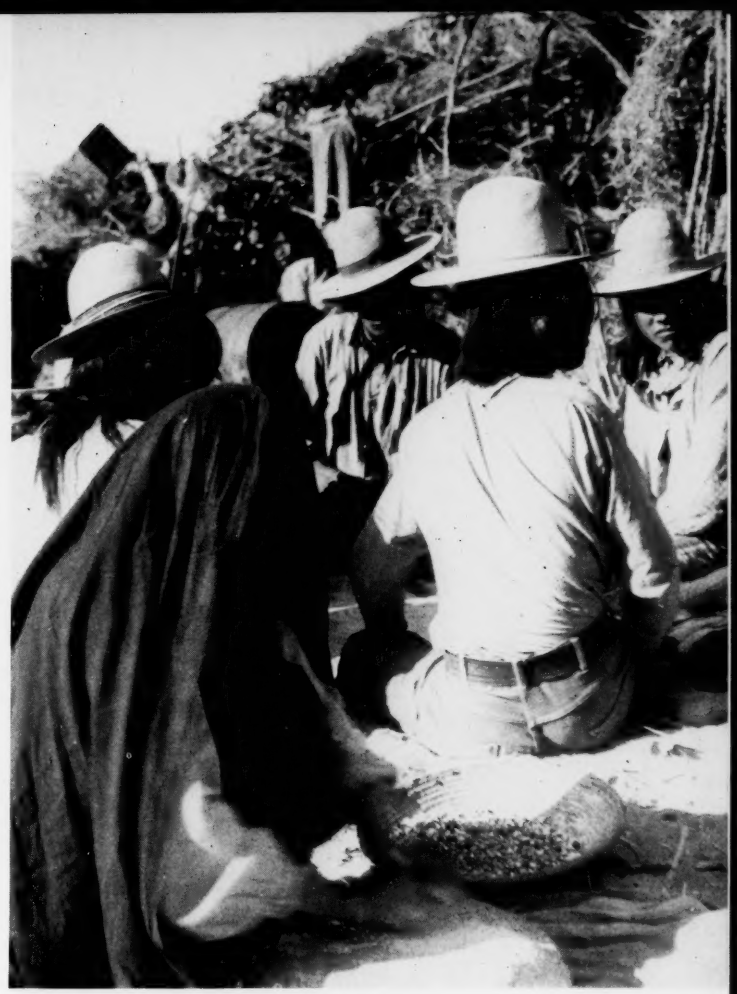
There were about one hundred Seris at Bahia Kino. They liked brilliant colors and were particularly fond of red and blue, both of which they made from native shrubs, and dyed most of their clothing. It was not unusual to see an Indian wearing a broad-brimmed felt hat of sky blue, and about his waist a sash of flaming red from which protruded a long butcher knife. This, with his keen black eyes, dark copper-colored skin and long hair, gnarled and knotted, hanging down his back, combined to form a rather fearsome individual. The Seris have an unsavory reputation as cannibals, though their present actions would not lead one to believe this.

They were great beggars and would carry away all the tin cans or other refuse we threw out from our camp. Old clothes were much sought. One day some Seris came into our camp with baskets to sell or trade. They wanted more value in money than they were worth, but an old wornout shirt and a few centavos to boot appeared a good bargain, and the new owner immediately pulled the shirt on over two others he was wearing.

These people seemed to have a keen sense of humor – they were always responsive to any little action that would provoke mirth. They had learned that photographs were not destructive to their chances of survival after death but they would collect a few coins for the privilege of letting a photographer make their picture. In this bargaining they were very adept, from the youngest to the oldest. The Seris had two canoes and fished with the other fishermen; however, they had their own code regarding the catch. Among the Mexican fishermen the owner of the canoe received a portion from the gross catch for the use of the boat. Not so with the Seris. If one of their number caught all the fish, he alone shared in the sale. There was no dividing with his neighbor, yet the neighbor in the end might be the better off – for gamble they would and any object that held value in their eyes was used. Sometimes the games, played with either cards or short sticks, would last several days and not until one Indian possessed the whole stake for which the group played would they quit.

The younger Indian men were good workers and some of the fishermen hired them to carry their catches from the beach to the loading platform each day.

Thus, oddly enough, some of the most primitive people of North America contribute their bit to the totuava fisheries and help to load trucks of the most modern type. END



Gambling kept the Seri men occupied. The Indian in the center has his spoils stacked beside him; the game ends when one player has all the possessions of each of the others. The woman, meanwhile – as women have through the ages – keeps things going, grinding parched corn on a rock metate. (Huey)

a quest for seafaring bats

ROBERT T. ORR

TO THE TOURIST a desert may bring to mind a land of pleasant winter resorts or of hot, desolate wastes to be avoided in summer. The naturalist looks upon the same area as a biological testing ground where plants and animals are forced to contend with an unfriendly environment and only those survive that adapt themselves, either by structures or habits or both, to conditions of intense heat and extreme aridity. There are many deserts in different parts of the world but one of the most interesting in North America is the Vizcaíno Desert of central Baja California.

Just as many other students of nature have done during the past one hundred years the writer and his three companions, Mr. Joseph Slevin, Dr. Francis P. Filice, and Mr. Samuel M. Carpenter visited this region in the summer of 1952 to observe its unique flora and to gather firsthand information on some of its forms of animal life. Our main objective was to study and collect bats, especially a species reported to live on small fish in the Gulf of California. En route, however, we collected many other kinds of animals.

Our travels led us down the Pacific side of the peninsula to the village of El Rosario about 230 miles south of the border by road. Along the way our several camps were either on or close to the colorful coastal bluffs overgrown with carpets of native iceplant. Much of the vegetation was reminiscent of coastal southern California as was the fog that rolled in each night from the west.

Going inland from El Rosario we soon came to a new land where the moderating influence of the Pacific was no longer felt. Since our visit to this region was during the dry season the plants we saw were for the most part hardy perennials capable of withstanding long periods of drought. On rare occasions when sufficient rain falls the desert floor becomes a garden of annuals, short-lived but capable of producing copious quantities of seeds. These seeds as well as the various products of the perennials provide food for a large rodent population. With the exception of several kinds of ground squirrels these mammals are strictly nocturnal. With night the Vizcaíno Desert becomes alive as kangaroo rats, pocket mice, white-footed mice, and wood rats emerge from their diurnal retreats where they have been conserving moisture during the heat of the day as they rest. Rarely did we have to worry about an empty trapline.

Bats presented another problem. These animals require deep recesses in rocks such as caves and mine tunnels for daytime hideouts. Consequently we may have given some of the natives an erroneous impression that we were erratic prospectors seeking the location of precious metal under the guise of bat collecting. At any rate we visited as many old mine tunnels and shafts as possible and found most of our winged friends holed up deep in the cool interiors of such places.

Our overland travel took us southeast to Bahia de los Angeles, about 450 miles from the border, on the Gulf of California. A few Mexican families live here, some of them engaged in turtle fishing. We were approaching the land of *Pizonyx** and, after discussing the reason for our visit with a

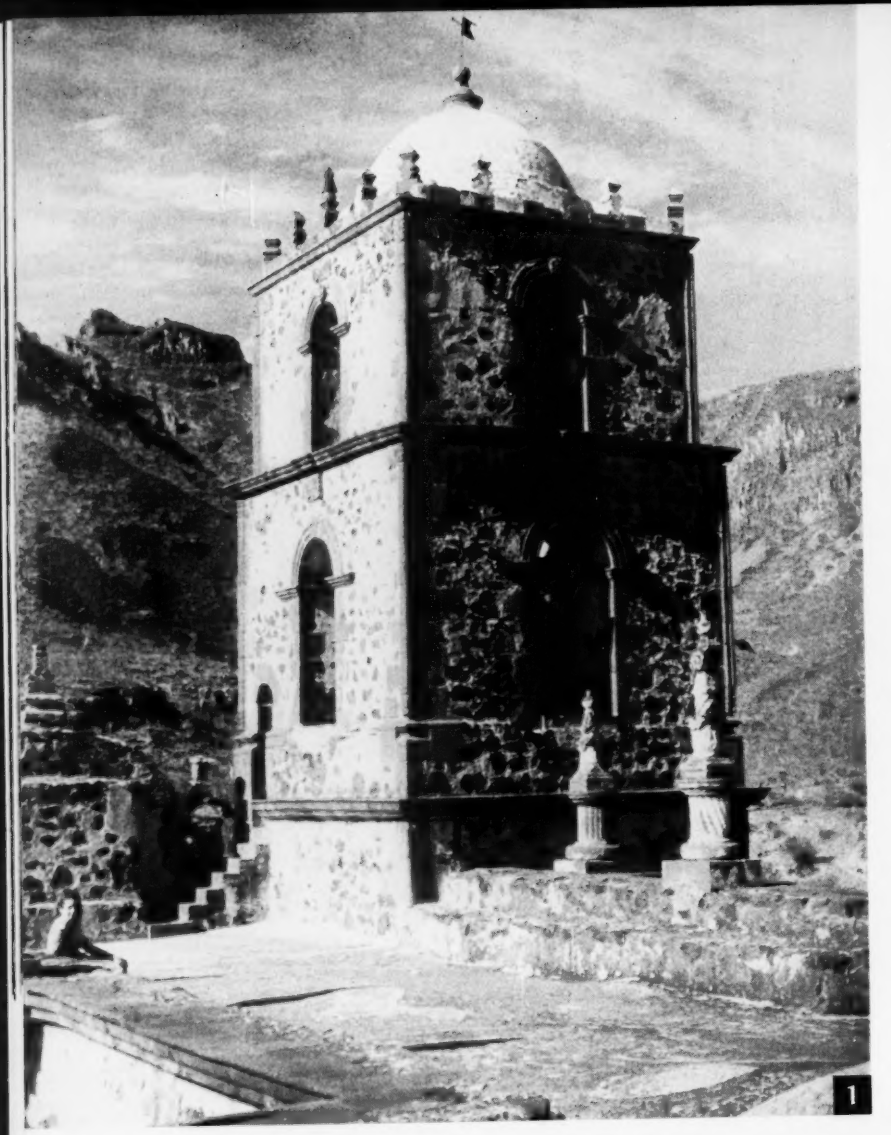
**Pizonyx vivesi* is the name of a vespertilionid bat known to eat fish. It has been found on several islands in the Gulf of California and in certain places occurs along the mainland coast of Baja California.

local guide, were hopeful that success was in store for us. He informed us of a small island some miles to the south where large bats could be seen flying over the water at night. Early the next morning, equipped with nets, guns, cameras, food, and water we embarked on a calm sea whose surface was broken only by numerous mullet that seemed continuously to leap out of the water.

I must admit I have never gone after bats in a boat before. Somehow it seemed incongruous, but my friend Mr. Slevin soon began to see rock slides, along the shore and on tiny islets, which reminded him of the locality on Isla Partida, many miles to the southward, where he collected *Pizonyx* in 1923. There the bats were living among rocks also occupied by petrels. We continued south for several hours, traveling parallel to Isla Angel de la Guarda, and finally our guide, who spoke no English, pointed to a tiny island and said " murcielago." This means bat in Spanish and we were approaching Isla Pescadero. We landed on a beach strewn with many-colored tropical shells and left most of our gear high up on shore since 20-foot tides are a daily occurrence. Despite the objections of nesting Fraser oyster catchers and western gulls we walked half way round the island which was not more than several hundred yards in length and found a small cave, the floor of which was covered with bat guano. It was obviously a night roost where the bats hang up periodically to rest and was therefore unoccupied in the middle of the day. A half hour or so of careful search on the limited land mass, however, revealed two crevices inhabited by squabbling bats. Emanating from each crevice was a fishy odor. Long-handled forceps, nets, and considerable patience beneath a sweltering sun which caused the perspiration almost to bubble out of our pores, produced the desired result. We had located two colonies of fish bats. They were nursing colonies consisting of adult females and young. As far as we were concerned our trip was a success although from the expression on our guide's face we knew we were permanently classified as *gringos locos.*

It was not until we returned to California that we discovered that Lewis Wayne Walker of San Diego visited this same isle several years before and had achieved equal success with *Pizonyx.* END

***(Left) Pizonyx* has needle-like teeth and claws — wise handlers always use gloves. *(Right)* Clefts between the upended strata of tiny Isla Pescadero in the Gulf make ideal homesites for the fish-eating bats. (Robert T. Orr, from Kodachromes)**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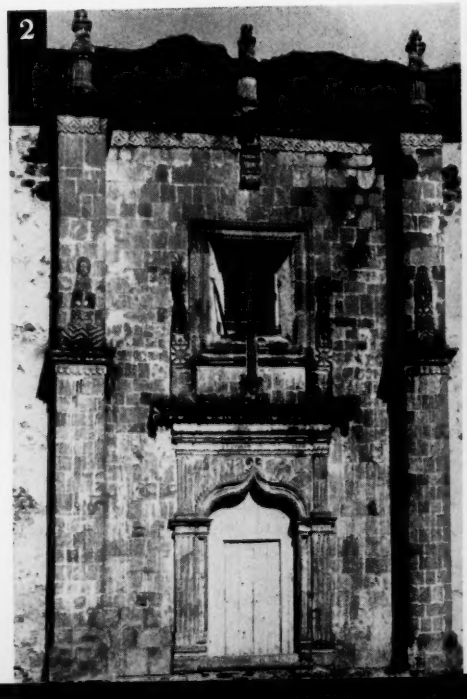
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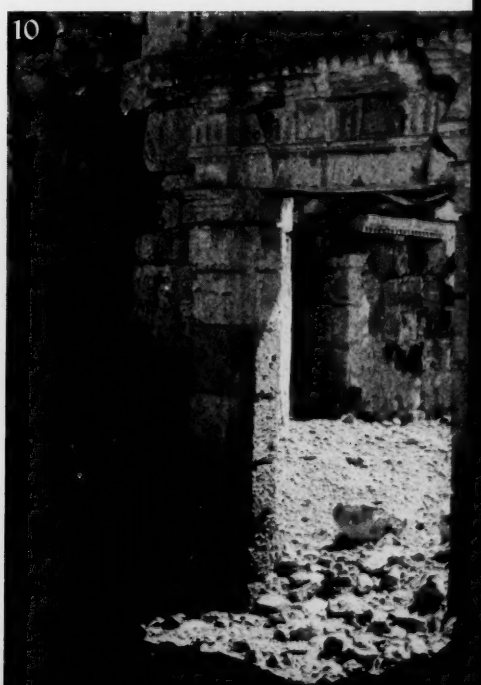
'El Misión'

✚ these are some of Baja California's old missions

1 Bell tower of San Francisco Xavier; and **2,** a door of the same mission (Neal R. Harlow). **3** Ruins of Santo Domingo, near Hamilton Ranch (G. E. Kirkpatrick). **4** San Ignacio de Kadakaaman (Roy W. Nixon). **5** Bells of the church of San Antonio in the Cape region (E. S. Ross). **6** San Fernando Velicatá near the northern end of the peninsula (Neal R. Harlow). **7** Interior of mission chapel at Loreto; and **8,** Mission at Loreto which was almost totally destroyed by earthquake many years ago (Ormal I. Sprungman). **9** San Juan Londó near Loreto — note the delicate molding on the rough stonework, and the exterior detail of the door, **10.** (Harlow)



North America's Oldest Date Gardens

ABOUT half way down the peninsula of Baja California there are several oases where date palms dominate the landscape and produce an atmosphere more suggestive of the Old World than the New. Here and in a few nearby localities in Sonora across the Gulf early attempts by Spanish missionaries to grow dates in the Western Hemisphere first met with some degree of success. Travelers who have written about this region seldom do more than mention the presence of the date palm without reference to the cultural background of one of the most interesting plant immigrants.

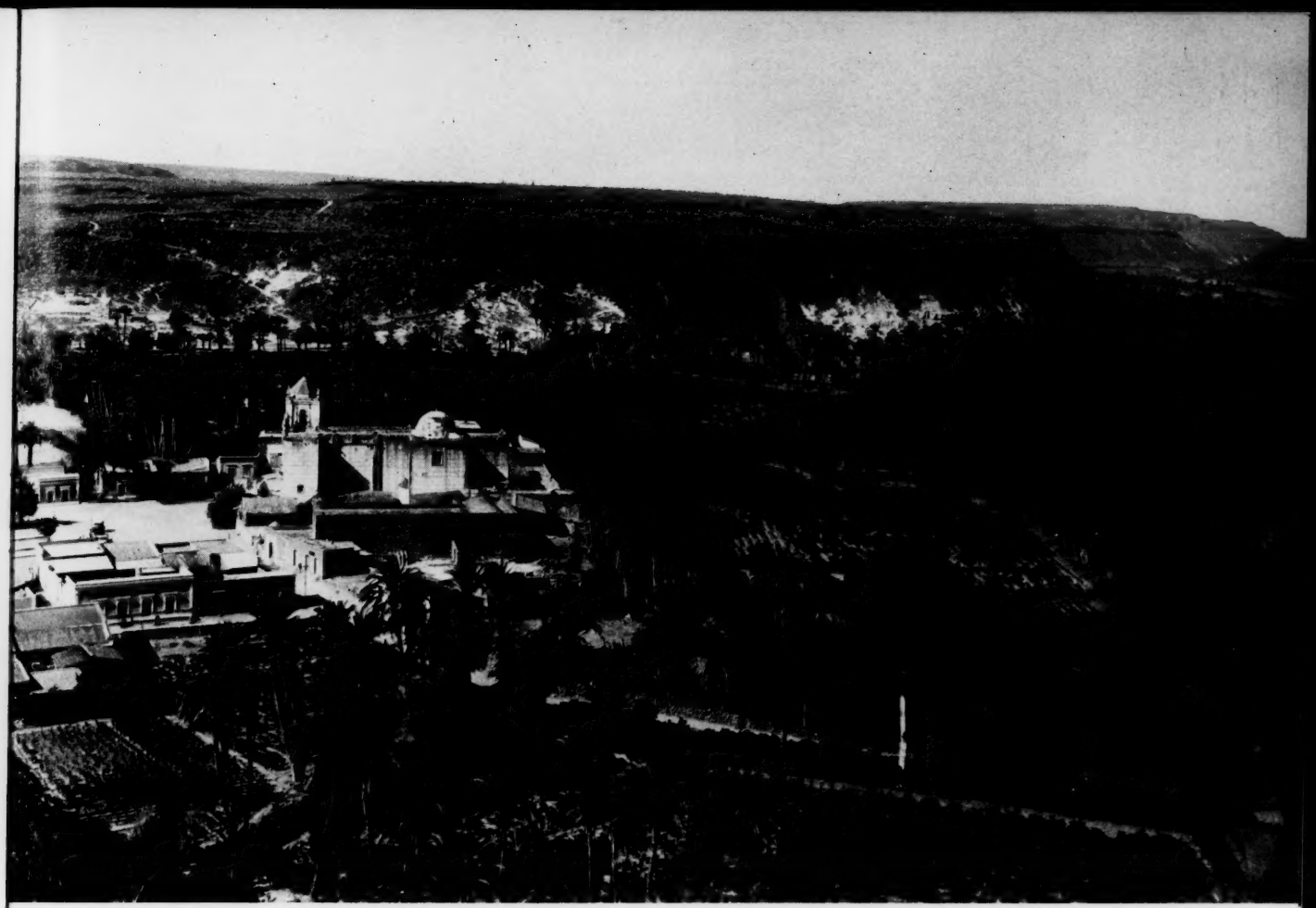
Thanks to Dr. Carl O. Sauer, head of the Department of Geography at the University of California, I recently had an opportunity to visit some of these oases in company with one of his graduate students, Homer Aschmann,* who was making a study of the agriculture fostered by the missions of Baja California. We crossed the Border at Tijuana on October 20, 1949, in a well-equipped truck and the evening of the first day found us at the end of the paved road about 100 miles below Ensenada. Then for five days we moved slowly down the peninsula, crawling up canyons and creeping over hills along a narrow winding trail. Occasionally there were comparatively level stretches over which the truck could gain a little momentum up to 20 or 30 miles an hour, a speed which by contrast began to seem almost exhilarating but which was often abruptly checked by dust-covered holes.

The late October weather was perfect and the desert landscape fascinating, whether seen by day from the truck or viewed at night from a cot under a clear starry sky near the smoldering embers of a campfire.

About noon of the last day we came to a broad

*Now with the Los Angeles State College, California.

ROY W. NIXON



plateau so thickly covered with volcanic rocks that those removed to clear the trail formed a continuous line, sometimes a low wall, on either side. After two hours of this we saw suddenly in the distance a break in the level of the plateau. An arroyo began to take shape, extending from northeast to southwest, and what from a distance first had the appearance of a green stream flowing between precipitous banks soon became thickly massed date palms. It reminded me of scenes along the Valley of the Ziz in the date country of southern Morocco.

The Old World atmosphere was heightened as we drove across the arroyo. The road is lined with rock walls and fences of date leaves. On all sides there is a jungle-like growth of date palms which tower skyward 40 to 50 feet and scale downward in size to young seedlings just emerging from the ground. There is no evidence of formal planting and the foliage shows much diversity of type, although there are many thick clumps of tall palms all alike because they represent a cluster of overgrown suckers or offshoots from one parent palm. The bottom of the arroyo is covered almost entirely with date palms, but there are some gardens along the sides where they are interplanted with grapes, figs, olives, pomegranates, oranges, lemons, bananas, and other crops. Water for irrigation is furnished by several springs arising in the bed of the arroyo about a mile above the point where we crossed it.

On the south side of the arroyo the road rises to a slightly higher elevation—a sort of shelf extending into the side of the plateau with the village of San Ignacio upon it. A couple of turns on narrow streets brought us to a neat, palm-thatched adobe house with doors which, with a removable balustrade, served also as windows. Here we found Señora Lerée, a gracious hostess who provided us with clean and comfortable beds in one of four rooms formed by painted cloth partitions. The partitions extended only high enough to ob-

(Left) **Where the road crosses the arroyo at San Ignacio the Old World atmosphere is heightened by the jungle-like growth of date palms behind rock walls and date-leaf fences.** ***(Right)*** **San Ignacio. The mission dominates the town; date palms fill the arroyo that has eroded out of the strata of the tableland. (Roy W. Nixon, left; A. E. Michelbacher, right)**

struct the view of the neighboring compartments; there was no ceiling to hide the interesting thatch of fan palm leaves cleverly tied to cross strips of doubled date leaf midribs supported by 4x4 rafters. Sometimes at night this thatched roof was a source of strange noises like an animal moving through dry brush – probably a prowling cat. The afternoon of our arrival was quite warm and we were glad to relax for a while in the cool shade of a grape arbor which covered the patio. Then we set out to explore the village.

San Ignacio is a small community of one-story adobe houses on narrow streets radiating from the central plaza characteristic of most Mexican towns. The population is about 1,000 with probably as many more who live in disconnected outlying settlements. Dominating the village from the west end of the plaza is the mission, a stone building with a bell tower on one corner and a Moorish façade topped with turret-like finials. Mission San Ignacio Kadakaaman was founded in 1728 by the Jesuits; the church owes its present form, however, to their Dominican successors.

We visited the priest, a friendly young Mexican who talked to us at some length about the community and its agriculture. From him we learned much that was subsequently confirmed from many sources as well as from observation. All the date palms at San Ignacio and the other oases in Baja California have been grown from seeds. The seeds are seldom planted, but the palms that come up spontaneously are allowed to grow with some thinning or transplanting where crowded. This does not confirm statements found in the literature to the effect that three varieties of dates were introduced by the Jesuits shortly after 1730 and have been cultivated since.* Date palms do not come true from seeds. Each seedling palm is potentially a new variety, but it is misleading to speak of it as such until other palms exactly like it have been propagated. Since the date palm cannot be budded or grafted, the only way of propagating a desirable type so as to give it the status of a variety is by means of the suckers or offshoots that are produced in the axils of the leaves, mostly near the soil surface while the palm is young. When the offshoots are mature and have begun to form roots of their own they may be severed from the parent palm and planted out to reproduce the same type.

Although the first date palms in California were grown from seeds planted at San Diego shortly after the founding of the first mission in 1769, the commercial date industry of California and Arizona is based on varieties that were introduced by means of offshoots from the Old World beginning in 1900. It does not seem probable that with the slow means of transportation available in 1730 the Jesuit missionaries could have brought in offshoots of varieties from the Old World. They probably knew little about date culture and could not have learned about the propagation of varieties from what they saw in Spain because all the date palms there are seedlings and no varieties are cultivated. It is much more likely that seeds of three different varieties of dates were imported, but because of the great variability and predominant inferiority of palms grown from seeds there has been no perpetuation of type. If seeds from only those occasional palms which produce superior fruit had been selected for planting through the years, the general level of fruit quality might at least have been maintained. In spite of their variability palms grown from seeds are more likely to resemble the parent palm than some other palm of different type. In the absence of any selection whatever there has probably been a gradual deterioration in the kind and quality of fruit produced in Baja California.

We learned also that artificial pollination is not generally practiced in Baja California, so that what fruit is set is the result of natural or wind pollination which seldom produces a maximum crop. The date palm not only does not come true from seeds, but it is also dioecious, or with male and female flowers on different palms. When large numbers of seeds are planted about half of the resulting palms will bear fruit and about half will bear only pollen. Early in the evolution of date culture it was discovered that one male, if its pollen was conserved and applied by hand, would suffice for 50 or more female palms. Thus arose the practice of artificial pollination which not only conserves water and space by eliminating unnecessary palms but also gives better and more uniform sets of fruit than natural or wind pollination. The propagation of date varieties by offshoots and the practice of artificial pollination were evolved in ancient Sumeria (the earliest civilization in southern Iraq) prior to 2000 B.C. and have been prerequisites in the development and improvement of date culture wherever it has become very important.

*Cf. Dunne, *Black Robes in Lower California*, p. 227.

Although we were in San Ignacio (latitude 27° 22′ N.) the last week in October I was surprised to find that the date harvest had not begun. Only a few extra early bunches of fruit had been cut here and there. By this time the date harvest at Indio, California, (latitude 33° 43′ N.) is usually about half complete and the fruit of early-ripening varieties all off the palms. The difference is due to the tempering influence of the nearby Pacific on San Ignacio.

After spending three days at San Ignacio we drove on to Mulegé. The road continues east about 50 miles across the rocky mesa, through the coastal hills to the mining town of Santa Rosalia, and then down the coast for about 40 miles. Santa Rosalia is the port for this part of Baja California and from it dates are shipped across to the mainland of Mexico.

Between Santa Rosalia and Mulegé there are several small groups of date palms growing along the beach within reach of high tide. They have the appearance of chance seedlings that have grown up around fishing camps, but in spite of the absence of any apparent care, the palms were in fair condition and some of them were bearing fruit. Although the date palm is more tolerant of salt than many other plants, the growth and production of these specimens so close to salt water is probably explained by the occurrence of fresh water in the soil beneath. This is a narrow coastal plain and in some instances fresh water is taken from shallow wells only a few hundred yards from the Gulf.

At Mulegé an arroyo breaks through coastal hills near the entrance to Bahia de la Concepción and forms a narrow lagoon extending more than a mile inland. The valley of the arroyo widens from a few hundred feet near the Gulf to half a mile or more at the village near the head of the lagoon. Just above the village there is a concrete dam which impounds the water from springs in the stream bed farther up and provides ample water for the irrigation of the narrow valley. The other crops interplanted with dates at San Ignacio are also found here with at least one addition, the mango, which is slightly more tropical in its requirements. Most of the palms are in the vicinity of the dam, but there are some along the edge of

Date palms along the Gulf coast between Santa Rosalia and Mulegé suggest a coconut-fringed Pacific island. (Roy W. Nixon)

the water all the way to the Gulf and in places there is a striking resemblance to the palm-lined banks of the Shatt Al Arab near the head of the Persian Gulf in Iraq, the largest, oldest, and most important date-growing district in the world.

The date harvest at Mulegé was at its height and there was ample opportunity to see all the operations involved. An experienced laborer slips off his shoes so as to get a better toe hold on the old leaf bases, then climbs the palm. He carries with him a machete and one end of a long rope. He works his way into the crown using the machete to remove interfering spines and a few leaves. Once in the crown he ties the end of the rope to a leaf and proceeds to harvest all the bunches one by one. As each fruitstalk is cut with the machete he lifts the bunch and places it with strands straddling the rope. Meanwhile a companion on the ground has taken hold of the other end of the rope and moved out ten or fifteen feet from the palm, just far enough to allow the bunch to slide down easily and to break its descent with a little slack at the bottom. Harvesting dates by cutting entire bunches is practiced in most parts of the Old World, but in California and Arizona fruit is usually picked individually from the bunch as it ripens and several pickings are normally required to complete the harvest.

The bunches are taken to a drying or curing yard and stacked in piles for three to five days. Then the fruit is picked off and spread out on strips of matting about five feet wide. In some small drying yards the matting is directly on the ground, but usually it is raised on a framework about three feet above. As all the bunches are cut when the fruit on a palm is only about one-fourth ripe, most of the dates are in the bright yellow or red stage immediately preceding final ripening. Culls, consisting mostly of unpollinated and damaged fruit, are removed for stock food. The fruit which is already ripe is separated from that which is immature and all is spread out on the mats. In

the middle or latter part of the afternoon the unripe fruit is heaped up by pushing it to the center from each side; then all of it is covered with leaves of fan palms. This protects the fruit from dew and low temperatures at night which would delay ripening. After the sun comes up the next morning the leaves are removed and the unripe dates are spread out again in a thin layer. The ripening and drying process requires from three to ten days.

Every second or third day the fruit is gone over to pick out the dates that have ripened and dried sufficiently to be packed. Dates that are to be shipped immediately are packed in heavy sacks or boxes. Those that are not to be shipped immediately are stored in *bunques*. A bunque is made of a strip of matting rolled into a cylinder about three or four feet in diameter and held in shape and reinforced by a wire or rope around the outside. The cylinder is simply set upright with the lower end on matting or palm leaves and the dates are poured in.

Diseases and insects are apparently no problem with dates in Baja California. The only insects seen by the writer were a few of the common nitidulid beetles that are a serious pest in some seasons in California and Arizona. The early stage at which the fruit is harvested probably prevents a build-up of the beetle population. Evidence of high relative humidity at both San Ignacio and Mulegé is to be seen in the presence on date leaves of graphiola fungus, which, however, only in the thicker clumps of palms appeared to be severe enough to cause earlier death of some of the older leaves. Perhaps the most serious losses of fruit result from the depredations of birds, particularly the raven, by day, and of the cacomixtle, a relative of the raccoon, by night.

Date palms are grown in several other localities in Baja California, but cultural methods are essentially the same. A rough estimate of the number of palms large enough to produce fruit or pollen is as follows: San Ignacio 50,000; Mulegé

Harvesting *(left, center)* and drying dates at Mulegé. (Nixon)

25,000; Comondú 20,000; Purísima 15,000; Loreto 15,000. About 15 or 20 per cent of this number are males which represents a reduction by subsequent thinning from the approximately 50 per cent grown from seeds. There are probably at least 20,000 additional date palms throughout Baja California; some in scattered small groups in various localities but the greater part in the vicinity of Todos Santos in the far south.

Climatic conditions toward the southern end of the peninsula, however, are less favorable for date culture. From available records the annual rainfall at San Ignacio is slightly less than the 3-inch average of the Coachella Valley of California. At Mulegé it is about 4 inches. At the lower end of the peninsula it increases to 10 inches or more. Although the date palm will grow in any tropical or subtropical climate where minimum temperatures below 20°F. are not of frequent occurrence, successful fruit production requires a long, hot growing season and a nearly rainless period immediately before and during ripening.

The total production of dates in Baja California is said to be between two and three million pounds. This represents a very low yield per palm, as would be expected from the conditions under which it is produced. In 1948 California, with a commercial acreage of approximately 250,000 date palms, about one-fourth of which were not in bearing, produced 30 million pounds of fruit. The quantity and quality of date production in Baja California could probably be raised appreciably within a few decades if an official program could be initiated to encourage (1) planting seeds and offshoots only from selected palms, (2) artificial pollination, and (3) improved cultural methods, particularly palm and bunch management with modifications adapted to the peninsula's climatic conditions.

It does not appear likely, however, that the acreage under cultivation in Baja California can be appreciably increased. Most of the water available is already being used. There may be some underground sources that could be developed but obviously they are not extensive. Yet one who loves nature for its own sake will not grieve because extensive agricultural developments are unlikely. He will rather be grateful that this unique desert is likely to remain for a long time essentially a primitive area in the hands of a friendly people who are not as anxious to exploit natural resources as are their neighbors to the north. END

"BOQUERON"

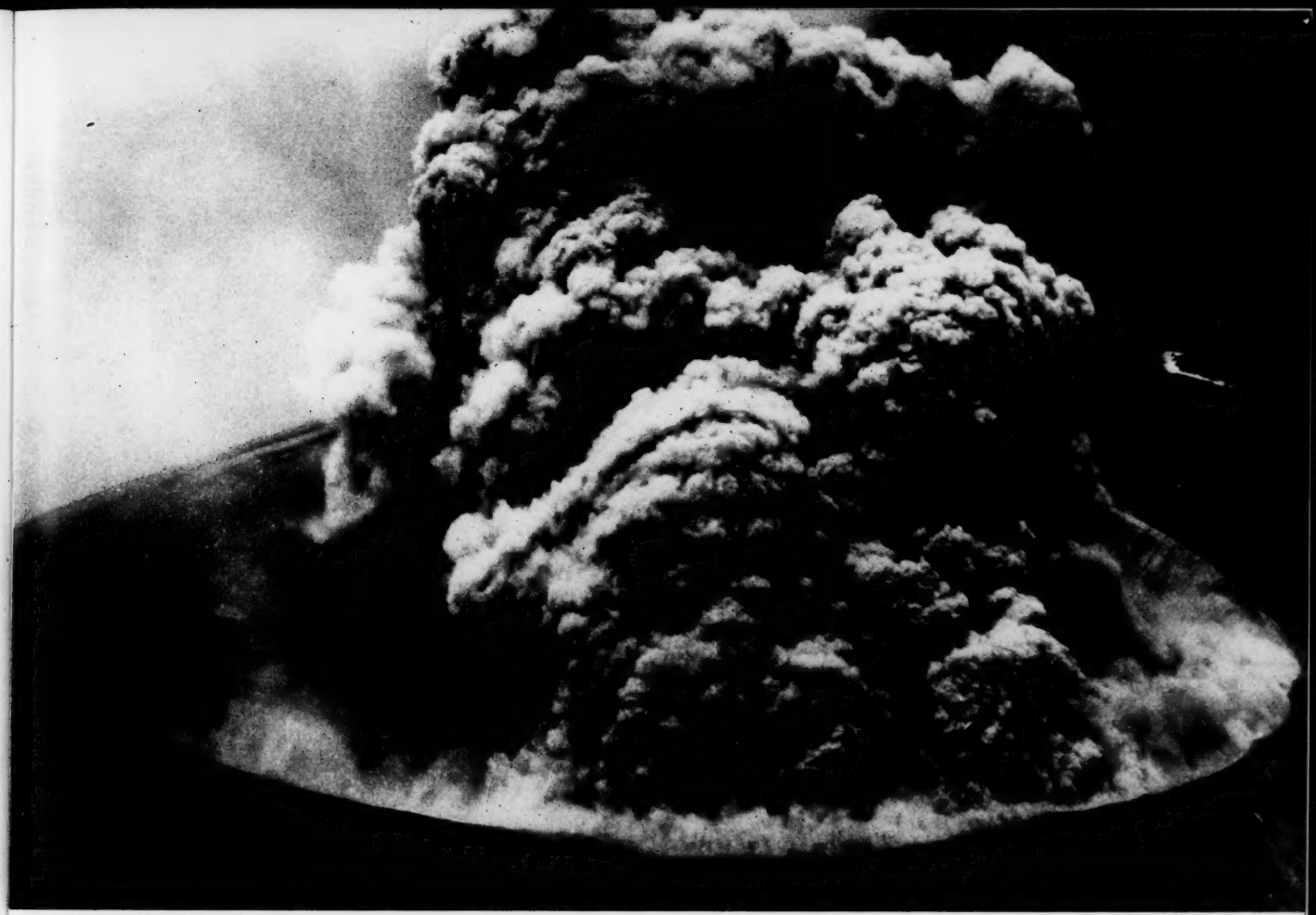
How San Benedicto blew its top with a tuna clipper standing by to get the story for science

TWO HUNDRED-FIFTY miles south of Cape San Lucas, Baja California's southernmost tip, and 350 miles west of Cape Corrientes on the Mexican mainland lies the Revilla Gigedo Archipelago. No islands close to North America are ordinarily of less concern to most people than the completely uninhabited and infrequently visited – except by an occasional fishing boat – four of this deep-sea group, Socorro, San Benedicto, Roca Partida, and (far to the west) Clarion. Then one day last summer tiny volcanic San Benedicto literally burst into the news. It began to erupt – with witnesses present. Our *PD* account of this event is taken by permission from an official report, "Volcanic Eruption of San Benedicto Island, 1952," by Robert S. Dietz, Navy Electronics Laboratory, San Diego, and begins with a note Dr. Dietz sent later to the Academy's Dr. G. Dallas Hanna:

"The tuna clipper *Challenger* arrived at San Pedro, California, about October 2. The following account was obtained from Joseph da Luz of that vessel:

" 'The *Challenger* arrived at San Benedicto Island in the early hours of August 1. At 0745 rumblings were heard and ash was seen being thrown into the air. This was the true beginning of the eruption because the water around San Benedicto was clear and blue but soon after the eruption began the water became murky with ash and remained murky. Within a few hours the island was in violent eruption and the *Challenger* was covered with about two inches of ash.

San Benedicto as members of a California Academy of Sciences Expedition saw it in 1925, showing the site of the new volcanic eruption. The view is south to the Ash Heap from the vicinity of Herrera Crater. The foreground portion of the Ash Heap was blown up or covered by the formation of the new crater. (CAS photo, G. Dallas Hanna)



The tuna clipper then moved off to Socorro about 35 miles away. From there a column of smoke could be seen rising indefinitely skyward. The *Challenger* remained in the vicinity of Socorro about three days. All during this period the volcano remained in continuous violent eruption. The *Challenger* then moved to the vicinity of Roca Partida where the eruption could still be seen with its smoke and gas column rising to more than 10,000 feet.' "

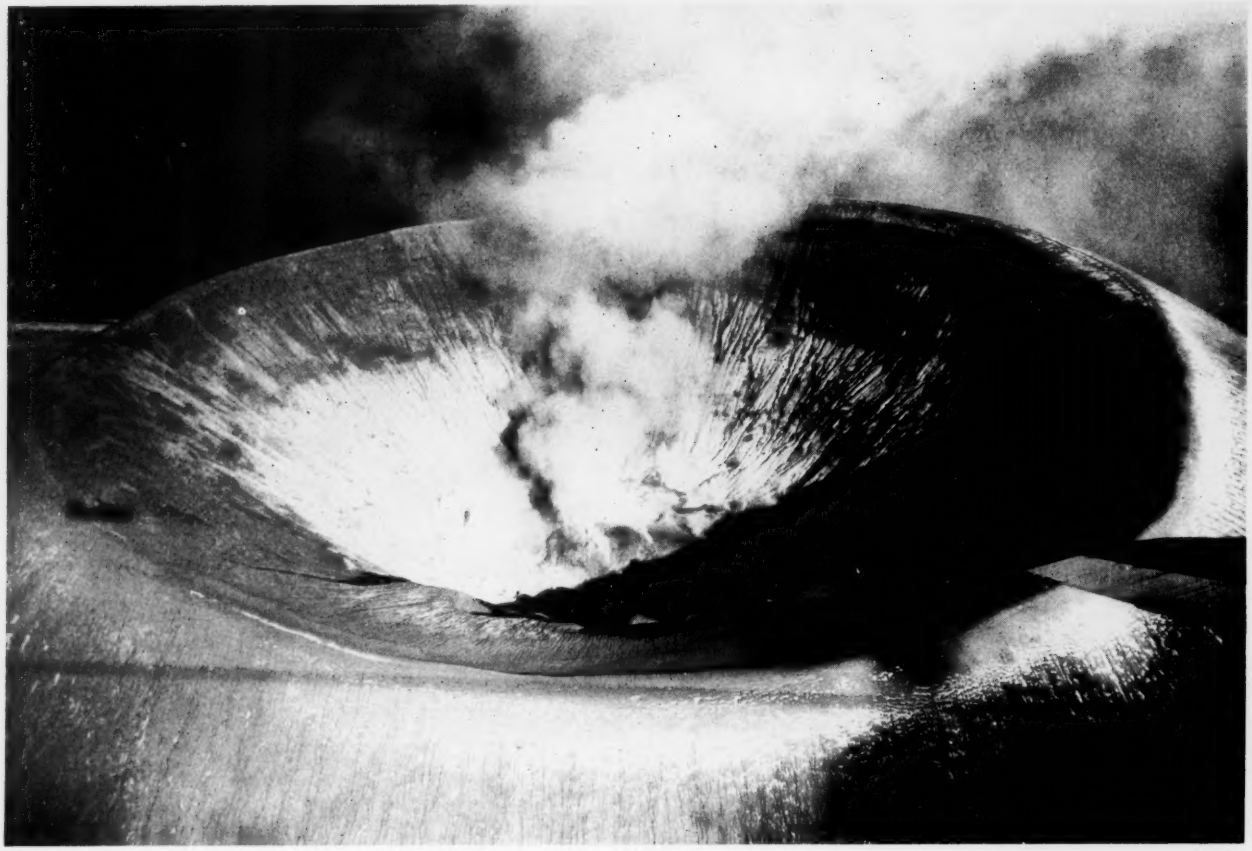
On August 27, 1952, Dr. Dietz had seen a news report in the Los Angeles *Examiner,* credited to Captain Robert Alcott, tuna clipper *Renown,* of "a newly active volcano" on San Benedicto. Knowing that unusual cloud formations can be mistaken for volcanic smoke, Dr. Dietz telephoned Alcott and learned that the story had originated with the people of the tuna clipper *Intrepid,* whose fish-spotting plane "was reported to have flown around the volcano and filmed it." (We quote from Dr. Dietz's report.)

"Additional evidence of a large volcanic eruption was obtained on August 30 when the research vessel *Horizon* of the Scripps Institution of Oceanography returned to San Diego" with the news that "on August 24 quantities of pumice were dipnetted at a hydrographic station 55 miles northeast of San Benedicto Island. . . . The pumice supported a small population of barnacles. On August 25 more pumice was dipnetted about 120 miles north of San Benedicto." These pieces were "smaller, well rounded, and darker" and their barnacles "were larger and some of the pieces were green with attached algae."

The *Horizon* continued on to San Diego, its staff unaware how close they were to a big story. "Floating pumice, of course, is not conclusive proof of an eruption because strong winds and storms often carry large amounts into the sea from volcanic islands." But when this item could be linked, after the *Horizon's* return, with the *Intrepid's* report it was "strongly suggested that a large explosion had occurred" on San Benedicto. "Because such eruptions are a great rarity in the Pacific Basin, it seemed urgent" to try to get some direct scientific observation under way.

Scripps, through Dr. Gifford Ewing, arranged with the 55th Strategic Reconnaissance Squadron, which makes daily weather flights over the Pacific, for the diversion of three B-29 flights in the direction of San

▲ The three air views of the new San Benedicto eruption are official U. S. Navy photos, courtesy U. S. Navy Electronics Laboratory, San Diego. (See next two pages.)



Benedicto. This could be done without hindrance to weather missions. Dr. Dietz, Dr. Ruy Finch, retired former director of the Hawaiian Volcano Observatory, and Grant S. Anderson, a Navy Electronics Laboratory photographer, made the first flight to San Benedicto September 12, after clearance from the Mexican Government. Dr. Dietz reports:

Air reconnaissance of September 12 and 20

"We arrived over San Benedicto Island about 1300. Scattered clouds kept us from seeing the new crater until we had almost reached the island. Only steam was being emitted from the volcano when we arrived but soon a large explosion took place ejecting a yellowish gray cloud and large amounts of volcanic ash. No large rocks nor volcanic bombs were being ejected nor were any large blocks observed on the cone which appeared to be entirely composed of pumice and ash. During explosive eruptions of this type, lava flows commonly form during the later stages of the eruption. These flows generally breach the base of the pumice cone rather than overflow the top of the crater. However, no lava was flowing during our visit nor could we see any signs of lava flows associated with present eruption.

"We circled over Boqueron Crater* for more than one hour. . . . Three explosions were seen, erupting at intervals of about 20 minutes and lasting five to ten minutes. Between explosions the crater was filled with steam but it was possible to see down into it part way on the windward side. Large slide and slump scars could be seen on the inside of the crater.

"A thick blanket of ash covered most of the island to depths up to probably several feet and possibly several tens of feet in some places. Over old dish-shaped Herrera Crater, the ash appeared like layers of icing on a cake. The ash cover had already begun to be eroded and channeled, suggesting that several rains had taken place since the last ejection of ash. Some pumice was floating on the water but not in great quantity."

On the second B-29 flight, September 20, Dr. Howel Williams, volcanologist of the University of California, and Ernest Boldrick, NEL photographer, accom-

*On the second aircraft flight, the name "Boqueron (Big Mouth) Crater" was suggested for the new volcano by Howel Williams, and has been proposed to the Mexican Government for consideration. Dr. Dietz considers this new landmark prominent enough to deserve a name, and hopes the University of California volcanologist's suggestion will be accepted.

panied Dr. Dietz. Excellent weather enabled mapping-camera runs, and stills and movies in both color and black-and-white from heights of 5,000 to 500 feet. Circling for an hour and a half, the scientists saw no more explosions, but there was steam under low pressure in which they detected hydrogen sulfide.

"Comparison of photographs showed that the form and size of the crater had not changed noticeably since the September 12 visit. . . . During quiet periods we could see a congealed lava plug in the throat of the crater. Steam jets emitted steam around this plug forming a 'coronet.' Apparently the eruption of Boqueron Crater was about at an end. The lava plug had apparently effectively capped the magma chamber . . ."

The Intrepid's story

It wasn't until September 24, when the *Intrepid* docked in San Diego, that Dr. Dietz got from Mr. C. Blasko that tuna clipper's story:

Their radio picking up the *Challenger's* report of the eruption, the *Intrepid* made for San Benedicto and got there about three in the morning of August 12. "The island was erupting violently, making a continuous thunderous roar, but no incandescence could be seen. A dense pall of acid smoke reduced visibility to almost zero." Milky water out to 15 miles prohibited fishing so they headed for Socorro, 40 miles south.

Late that morning Mr. Blasko flew back to San Benedicto in the Piper fish-spotting plane. Even from windward of the crater he could hear the eruption above his motor. "Rocks as large as the galley were ejected reaching heights of 1,000 feet above the plane which was flying at 1,800 feet. These rocks buried themselves when they landed on the cone. They estimated the smoke cloud to extend for 150 miles from the island. Rain was falling continuously from this cloud." Blasko judged the crater to be about 1,000 feet high and the same distance across. Dr. Dietz reports that Blasko's kodachrome movies "amply confirm his description of the intensity of the eruption."

Finally the *Challenger* report came in, to complete a remarkable series of observations of a major volcanic eruption which, Dr. Dietz notes, might have run its course unobserved. It was just good luck for science that an alert tuna clipper was fishing those waters when Boqueron began to blow. END

'Sea of Cortez' revisited, or 'Cannery Row' revised

TOWARD the end of 1941 a well-known novelist by the name of John Steinbeck, and Edward F. Ricketts, a marine biologist of less renown to the world at large, presented to the somewhat bewildered world of letters a thick book about a collecting trip to the Gulf of California, under the title: *Sea of Cortez: a leisurely journal of travel and research. With a scientific appendix comprising materials for a source book on the marine animals of the Panamic faunal province.* To the critics who were convinced that something was wrong with Steinbeck as a writer, this "sort of chop-pino of travel, biology and philosophy"* was full of clues and material for essays, and in recent years three such essays have appeared in the *Pacific Spectator* alone.†

At least one well known reviewer of nature books somewhat innocently thought that the "colleagues of the learned Mr. Ricketts" would be surprised to learn that he drank great quantities of beer, and "wrote, or concurred in" certain bawdy speculations.‡ He did not, however, miss the fundamental point that the book was the joint effort of two authors, who had a lot of fun putting it together.

That was ten years ago. Steinbeck and Ricketts had such a good time with this enterprise that they planned another – northward, this time – at first, to the Aleutians, then, more realistically, to the Queen Charlottes; and Ricketts began to develop a scheme to interlock his *Between Pacific Tides* with *Sea of Cortez* and the new book, *The Outer Shores*, which was to be in part the result of this northern expedition. He had an elaborate set of cards in two sizes and several colors printed to record all this information, with spaces for cross references to the other books. In the meanwhile, Ed Ricketts had become the Doc of *Cannery Row* and the legend was beginning to grow. Then one day in 1948 Ed forgot about the afternoon train to Pacific Grove and drove his car into its path. It was not a pleasant or an easy way to die, and the manner of it increased our sense of loss. For many of us, the heart has gone out of Cannery Row now, and only the curious passers-by go down to look at the shack that was once the "Pacific Biological Laboratories." Steinbeck was the hardest hit, because Ed was perhaps the only friend who was not in the least awed by his reputation as a writer and treated him first as a human being. When you become a famous writer, it is something like being rich: it is not easy to be sure that your friends are really your friends. He could never have any doubts like that about Ed Ricketts.

It is for the sake of saying what he had to say about his friend that Steinbeck has published this edition of *Sea of Cortez.** It consists of the narrative portion of the original book, up to page 271, with this long preface, or "profile." All the lovely color photographs of seashells, the black and white photos and drawings, and the "Appendix" have been omitted. This would probably have made Ed a little sad, as it was this part of the book he hoped to add to, correct, and bring into agreement with his other work at some future time. There is some good material in this omitted portion of the book, and biologists will have to refer to the original edition for it.

Usually a preface to a new edition is not given much space by reviewers, but this 67-page "profile" will be approached by critics as further source material for the "Steinbeck problem," while friends of Ed Ricketts will read it to learn how Steinbeck knew him: "As I have said, no one who knew Ed will be satisfied with this account. They will have known innumerable other Eds. I imagine that there were as many Eds as there were friends of Ed." With such a disclaimer, we are left without too much to say about this portrait by Steinbeck, and are invited, in effect, to write our own, if we are not satisfied. In writing about Ed Ricketts, John Steinbeck has attempted one of the hardest writing jobs he has ever set himself to do. In a way, he has succeeded – at least, the history of this interesting friendship, and something of the personality which has had such an influence on one of our major writers has been set down. But as one who knew Ed as a fellow biologist, and didn't care how he managed his private life, I find some curious gaps in this "profile."

Perhaps it doesn't matter if some things are not quite true, as Steinbeck suggests (though a biographer would disagree violently), but it does seem odd that he should so underemphasize the activity of Ed Ricketts as a biologist that it is difficult at times, when reading this piece, to remember that the man was after all a devoted biologist. There are a couple of minor points which should be set right, and in setting them right, we say some things that are significant about Ed. Steinbeck states that Ed Ricketts obtained the Bachelor of Science degree, but the fact is that he never bothered to meet all the requirements at the University of Chicago, although he did the things he wanted

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* *San Francisco Chronicle*, Dec. 14. 1941.

† "Steinbeck against Steinbeck" by Donald Weeks, vol. 1, no. 4, pp. 447-457 1948); "Steinbeck and the biological view of man" by Frederick Bracher, vol. 2, no. 1, pp. 14-29 (1948); "Steinbeck: one aspect" by Blake Nevius, vol. 3, no. 3, pp. 302-310 (1949).

‡ *Saturday Review of Literature*, Dec. 27, 1941.

* *The Log from the Sea of Cortez.* The narrative portion of the book, *Sea of Cortez*, by John Steinbeck and E. F. Ricketts, 1941, here reissued with a profile "About Ed Ricketts." New York: Viking Press, 1951. $4.00.

(Left) **Ed Ricketts, and** *(right)* **Ed Ricketts, as marine biologist and "wedding guest in mufti," respectively. (Photos by William Bascom)**

to well enough to receive an honorable mention, and left Chicago without a degree. Another little point is about that professor he so cordially hated: Steinbeck writes "It never developed why he hated" him; but Ed despised sloppy work in biology, and conversely, thoroughly appreciated a sound job of research embodied in a well written, nicely illustrated paper, and he considered that this certain professor's work was indeed sloppy, and further, he seldom, if ever, sent his reprints to Ed.

While we are correcting little facts, it might be well to set that one about the biological supply business straight. During his years at the University of Chicago (1919-22), Ed numbered among his friends A. E. Galigher and J. Nelson Gowanloch, and for a time these three lived together in an apartment they fondly called "The Boar's Nest." As much as we might like to, we cannot elaborate upon this phase of Ed's life here. Suffice it to say that Gowanloch, who died May 28, 1952, was one of the fascinating personalities of New Orleans, where he was for many years Chief Biologist for the Louisiana Department of Conservation; and Galigher runs a successful business in prepared slides in Albany, California, and is a mainstay of the local Rotary Club. The Pacific Biological Laboratories were started in Pacific Grove by Galigher, and Ed came out a year later, in 1923, to be a partner in this enterprise, and a year or so after that bought out the business.

One interesting episode from Ed's college life is worth mentioning, since he made it a matter of record.* "One fine day in November," of an undated year, when the weight of his school work and the exigencies of supporting himself were running down his health "considerably," he left the university, and disembarked from the train at Indianapolis to walk through the South with a 34-pound pack. He got as far as Savannah, hiking across the Cumberlands, stopping for a while to work as a farm hand near Knoxville. Just why he hit upon this idea to escape from a love affair (the explanation given in the article is of course not the real one), he did not say, and it was not until he browsed in the public library at Savannah that he read John Muir's *Thousand Mile Walk;* at least, that is the implication of his article. It is worthy of notice for several reasons. Ed had more to say about the simple, kindly people he met than the scenery; he enjoyed talking to the mountain folk around their firesides and attending their revival meetings, and the closing scene of this brief article is a sketch of morning in a Savannah cemetery after a storm, listening to the voices of the Negroes singing their spirituals. The article ends in mid-air, on a rising inflection, so to speak, as if it had been intended to be the first instalment of a series.

The most conspicuous oversight in Steinbeck's profile is the failure to mention that Ed wrote another book – which began as a collaboration between him and his friend Jack Calvin (who now runs a printing business in Sitka, Alaska), and which is an enduring contribution to the literature of seashore biology: *Between Pacific Tides.* It was probably the publisher's doing that the listing of this title has been removed from this reissue of *Sea of Cortez;* it should be restored in further printings. This little detail and the general tone of Steinbeck's memoir may leave the impression among uninformed readers that the narrative part of *Sea of Cortez* is even more Steinbeck's doing than it was. Anyhow, *Between Pacific Tides* is one of the few seashore books in which the attempt is made to view the seashore as an interrelated whole rather than the place where one can see a lot of different animals at low tide. Now and then, of course, this viewpoint is lost in details, but the book stands, in a way, as a tribute to the teacher at Chicago who had the greatest influence on Ed, W. C. Allee. Many of Allee's ideas persist, in somewhat transmuted form, in the philosophical views of his student, and later, in Steinbeck's writings. Future critics who may feel that they have more to say on this problem than has already been said, would do well to start their study by reading Allee's *Animal Aggregations,* thereby at least beginning somewhere near the beginning.

All of us are privileged to have our philosophies and speculate as we please upon the *summum bonum,* and it seems to me that more than enough has been said on this aspect of the Steinbeck-Ricketts friendship. That Steinbeck may not have always succeeded in his literary endeavors is not Ed's fault, and his tendency toward a sentimental detachment from the problems set forth in some of his books is a native trait, discerned long ago by T. K. Whipple, who described it as viewing the scene through a soft amber light. That Steinbeck himself is something of a frustrated biologist is plain from his remark that biologists are the tenors of science (a remark which perhaps only a tenor can fully appreciate), and as Ed once remarked, John's capacity for needle-sharp observation

* "Vagabonding Through Dixie" by Edward F. Ricketts. *Travel,* June, 1925 (vol. 45), pp. 16-18, 44, 48. The episode is mentioned in *Cannery Row.*

Santa Barbara: a local guide

A FLORA OF SANTA BARBARA. By Clifton F. Smith. Santa Barbara Botanic Garden, Santa Barbara. 1952. 100 pp., 6 photographs. Paper, $1.50.

This entirely admirable guide to the plants of Santa Barbara and vicinity lists 1018 species and 148 lesser entities, and of the species, 626 are native and 392 naturalized or escaped from cultivation. The catalogue of plants is preceded by a concise and adequate description of the area, its climate, its vegetation types, and its botanical history. In the catalogue, the species are arranged alphabetically by scientific names and a common name is given if the plant has one. The comments that accompany each plant tell of the habitat and geographic occurrence, information on the botanical history, and various other items of interest that may relate to the particular species. The catalogue is followed by a list of references, a geographical gazetteer, and an index to generic and common names.

The work has been carefully prepared and beautifully printed, so that I have no adverse criticism to offer, no suggestion for improvement. The half dozen handsome plates are well chosen to show the botanical and cultural scene and their superb reproduction leaves nothing to be desired. Certainly the people of the Santa Barbara area are fortunate in having so adequate a work prepared for their use, while the botanists of California, professional and amateur, will find the work invaluable for reference. All of us should be grateful to Mr. Smith, to the Santa Barbara Botanic Garden, and to those who contributed to the publication fund for adding so fine a local flora to our literature of California botany. J. T. HOWELL

Botany Department
California Academy of Sciences

Mexico: collecting localities

BIOLOGICAL INVESTIGATIONS IN MEXICO. By Edward Alphonso Goldman. Volume 115, Smithsonian Miscellaneous Collections, Smithsonian Institution, Washington, D.C. 1951. xiii + 476 pp., 71 plates of photographs, folding map. Price not indicated.

During the years 1892 through 1906 the late Major Goldman and Dr. Edward A. Nelson made a series of extensive field trips in Mexico and a portion of Guatemala to collect birds and mammals. Their travels took them into every state and territory of this biologically diverse country.

The present volume places on record the itineraries of these trips, notes on the various localities visited, and the author's impressions and generalizations on life zones and related subjects. The bulk of the work (252 pages) is de-

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would have served him well had he become a biologist.

To say that Ed was holistic in his thinking is simply to say that he was by temperament a naturalist, devoted to achieving some synthesis of the world about him. As William Morton Wheeler once observed, such people usually become hard-boiled Aristotelians, but Ed was a soft-boiled one, unable to exorcise his inherent mysticism. He lacked the toughness of mind to adhere to an established intellectual discipline, either as a biologist or a philosopher; he lived and thought as he pleased. Those of us who had to knuckle down to conventions and circumstances envied him at times. Yet he was not always as happy in this manner of living as we who envied or admired him might imagine that we could be in similar circumstances. As Steinbeck says, he was looking for something—most often in love, but in music and in the tidepools as well – that he did not find.

On one plane he was the archetype of the Steinbeck hero (out of the clinically detailed pages of a book for men only), on another, a lost soul. Well, we are all lost souls, seeking salvation of some sort or another, but it is characteristic of Steinbeck that he does not come to grips with this aspect of Ed's character – perhaps he will in some future writing, at least by indirection. Although his critics do not use these words, they do agree that the flaw in Steinbeck's writing is his failure to meet this problem of salvation – like Ed, he is contented to take things as he finds them.

Certainly one does not try to reform one's friends, especially after they are dead, and least of all, to censure them for their faults, whether they be those of glandular imbalance or lack of philosophical discipline. It would be unkind, and not quite true, to say that this profile is simply *Cannery Row* in a new key – it is a portrait of a friend, written in kindness and love. I wish I knew how to say things as well, yet enough has been said, indeed, to demonstrate that he was a rare and lovable personality.

As for his eccentricities, they are all true enough – how many times have we been asked if there really was a beer milk shake, I wonder; he was gravely polite to dogs yet a competent embalmer of cats, and in his attire a veritable wedding guest in mufti. His easy-going attire was the cause of an unpleasant little incident in the library of a certain research foundation, but he got his revenge by making critical remarks about the rich man in science in *Sea of Cortez*. Things happen to – and around – people like Ed, and even Steinbeck, with his love for a good story, has hardly scratched the surface of the store of anecdotes.

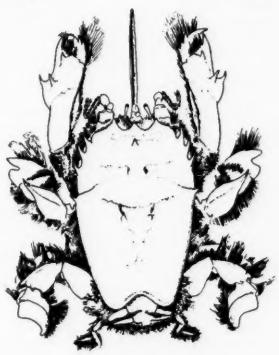
But it must be said again that Steinbeck has not said enough about one of the most enduring labors of Ed's life, of how for these last ten or twelve years students of marine biology have found, in the book he started to write for his friends out of the background of those years of hours in the tidepools, their introduction to the seashore of the Pacific Coast. Certainly *Between Pacific Tides* proved that Ed was one of Allee's finest students, and the professor may well remember him as a "sometimes disturbing, but always stimulating" student, "one of a group of Ishmaelites."

JOEL W. HEDGPETH

voted to notes on the collecting localities. Unfortunately the readability of this interesting material has been largely lost by the decision to arrange the localities in alphabetical rather than in chronological sequence. The ample index should have made this awkward arrangement unnecessary.

The terminal portion of the text, dealing with Mexico's physiography, climate, life zones, etc., will be of greatest general interest. Each life zone is briefly described and its characteristic birds and mammals are listed. The field notes will be useful to students referring to the Nelson-Goldman collections or to persons contemplating field work in the same regions.

The 135 photographs provide an excellent impression of Mexico's highly varied biotic scene. Unfortunately too large a number of these deal with Baja California and most, if not all of these, appeared previously in Nelson's monograph on Baja California (Memoir No. 1, National Academy of Sciences, Volume 16). E.S.R.



Spiny sand crab *(Blepharipoda occidentalis)*, ½ size. From *Between Pacific Tides*, copyright by Stanford University Press. (Courtesy of the Press)

Higher high

BETWEEN PACIFIC TIDES. By Edward F. Ricketts and Jack Calvin. Third edition, revised by Joel W. Hedgpeth; Foreword by John Steinbeck. Stanford University Press, Stanford, California. 1952. xiii + 502 pp., profusely illustrated with line drawings and photographs. $6.00.

"An account of the habits and habitats of some five hundred of the common, conspicuous seashore invertebrates of the Pacific Coast between Sitka, Alaska, and northern Mexico," *Between Pacific Tides* was first published in April 1939, with a revised edition appearing in August 1948, three months after the senior author's death. In the life of its first edition this book had begun to supersede the older (1927) classic of Johnson and Snook, *Seashore Animals of the Pacific Coast,* although the latter is still "an essential reference" to be consulted in libraries. For the present generation, and probably the next, of beginning marine biology students and amateurs of the tidepools, Ricketts and Calvin is *the* book so far as the Pacific Coast is concerned.

All who cherish copies of the earlier editions will be interested in learning that Joel Hedgpeth — Stanford Press could not more happily have chosen a reviser—has brought nomenclature up to date, added new material and illustrations, and revised the weighty appendix (or -ices). This last may look forbidding to the nonprofessional user; but it is a pleasant exercise to wander around in the amazingly replete bibliography, with especial delight in discovering some Hedgpethian gems in the fine-print commentary. It is a particular pleasure, for this reviewer, to find in this edition a selection of Mrs. Janish's exquisite drawings of marine algae from Smith's *Marine Algae of the Monterey Peninsula,* and a number of the photographs of our *PD* contributor Woody Williams. Many drawings have been replaced by better ones; and figures annoyingly upended in the 1948 edition have been set to rights. Hedgpeth has contributed a nice endpaper map of the Pacific Coast (charmingly loose in style to a professional cartographer!) Offset printed on much thinner paper, this 502-page edition has exactly one-half inch less bulk than its 365-page predecessor! The attractive and substantial binding is the same. All in all, here is an old friend with enhanced inner worth. A good job, Joel!

Hedgpeth properly berates Steinbeck (see page 29) for failing to mention *Between Pacific Tides;* by not mentioning his own part in the conscientious revision, this maverick marine biologist leaves us no choice but to call attention to his estimable modesty. Dr. Hedgpeth, his scientific qualifications attested by a considerable published output as editor, critic, and worker in diverse scientific pastures, currently corresponds on the letterhead of Scripps Institution of Oceanography. But we like to think of him as an indefatigable lancer of sacred cows in those pastures — we cherish one of his letterheads of former years: in quaint, vermilion type the legend, "Society for the Prevention of Progress," address to be typed in according to latest whereabouts. D.G.K.

DISCOVERY IN BOOKS

How many Mexicos?

SOLDIERS, INDIANS, & SILVER: *The Northward Advance of New Spain, 1550-1600.* By Philip Wayne Powell. University of California Press, Berkeley and Los Angeles. 1952. xi + 317 pp., 4 maps. $4.50.

MANY MEXICOS. By Lesley Byrd Simpson. Third edition, revised and enlarged. University of California Press, Berkeley and Los Angeles. 1952. 349 pp., 2 text figs. end-paper map. $5.00.

Mexico's very nearness is enough to make that complex region, for Americans, a perennial field for study in history, geography, and the biological sciences. The mere next-doorness of that friendly but foreign land, however, is not enough to account for the steady stream of books written, published, and presumably read, about it. It may be ventured that perhaps for Westerners — particularly Southwesterners and Californians — there is an added sense of belonging in small or large degree to the Spanish Colonial tradition. Some of us have reason to feel closer to that than to our Atlantic Seaboard beginnings.

Whatever the reason, interest in the Mexico story has been holding up well enough to put Lesley Byrd Simpson's *Many Mexicos* into its fully deserved third edition (1941, 1946: New York, G. P. Putnam's Sons) in very attractive format by the U. C. Press. Mr. Simpson has brought his lively "history" up to late 1951, and it is for obvious reasons the latter part of the book that shows the most revision and addition. "This volume does not pretend to be a history of Mexico," the author said in the Preface to the first

edition. "What I have attempted is a work of exposition and digestion . . . a discussion of such institutions, of such habits of life and thought, and of the lives of such men as, in my opinion, have left the deepest impress on the country."

Knowing Simpson's self-imposed limits, one is not too surprised or disturbed, then, to find that Baja California does not even rate an entry in the Index – except for the Jesuit missionaries, that remote peninsula lived through three centuries of the Kingdom of New Spain virtually apart from the stream of Mexican life and history. After reading Philip Wayne Powell's intensely detailed and documented history of one part of New Spain during one half-century, however, this reviewer is perplexed at Simpson's total omission of any mention of the Chichimeca War, which the associate professor of history on the University of California's Santa Barbara campus has ably made out to be the chief headache of all the viceroys in Mexico City between 1550 and 1600.

However incompetent we may be to criticize Simpson's undoubtedly deliberate omission of deeds done on the dark and bloody ground of the Gran Chichimeca, we may enjoy in Powell–if we can bear with his exhaustive thoroughness – a crisp close-up of men and methods, of doings and dealings on the great silver frontier northwest of the Valley of Mexico. And there is a lesson in the futility of fifty years of bloody but indecisive action between soldiers and Indians, and the final settlement only when peace was adopted as policy, and captains surrendered leadership to friars. Finally we see the beginnings of the Jesuit development of the northern frontier lands, and the eventual "bridge" across the Sea of Cortés to Baja California.

BLACK ROBES IN LOWER CALIFORNIA. By Peter Masten Dunne, S.J. University of California Press, Berkeley and Los Angeles. 1952. x + 540 pp., 12 illustrations, map. $6.50.

OBSERVATIONS IN LOWER CALIFORNIA. By Johann Jakob Baegert, S.J., translated from the original German with an Introduction and Notes, by M. M. Brandenburg and Carl L. Baumann, University of California Press, Berkeley and Los Angeles. 1952. xx + 218 pp., 7 photographs of missions by Neal R. Harlow. $5.00.

KINO'S HISTORICAL MEMOIR OF PIMERIA ALTA: *A Contemporary Account of the Beginnings of California, Sonora, and Arizona,* by Father Eusebio Francisco Kino, S.J., pioneer missionary explorer, cartographer and ranchman 1683-1711. From the original manuscript in the archives of Mexico, translated into English, edited, and annotated by Herbert Eugene Bolton, Ph.D. Two volumes in one. University of California Press, Berkeley and Los Angeles. 1948. 379 + 328 pp., map. $7.50.

The decision to include Kino in these notes had already been made, but by unhappy coincidence these words are being written on the day that Professor Bolton's death at 82 was announced in the morning papers. His discovery of the great padre's memoir in the Mexican archives in 1908 was an historical find of the first order. The 1919 edition has long since become a collector's item, but the 1948 offset reprint made this work once more available to students of history and to the general reader who is stirred by the romance of those times in what is now our southwest borderland or who wants to follow up on Kino's part in the early explorations of Baja California and the Gulf, and the establishment of the peninsular missions. His own attempts abortive, Kino inspired the first great hero of Dr. Dunne's well paced narrative, Padre Juan María Salvatierra, actual founder of the California mission chain. *Black Robes* begins with a description of Baja California and its Indian inhabitants as the explorer missionaries saw them, takes us swiftly through 150 years of discovery from Cortés, 1533, to Atondo and Kino, 1683, and then to the first permanent settlement at Loreto in 1697. Kino was to have returned from Sonora with Salvatierra, but it was Pícolo who got the orders instead. Four years later, "the great" Father Ugarte joined them; from there on until Salvatierra's death in 1717, it is the story of three of the most heroic figures of California history. They overcame almost incredible obstacles and the blackest discouragements to establish the first strong links in a chain of missions in one of the most forbidding regions on earth.

After Pícolo's death in 1729 and Ugarte's in 1730, there are other names associated with exploration and expansion: Fathers Taraval, Consag, Link – this is a book of the peninsula's exploration. Then there was one, among the others, who stands out because he wrote a book about Baja California and its people among whom he labored for 17 years up to the expulsion of the Jesuits in 1768. Father Baegert's *Observations* furnishes Father Dunne's chief source, frequently cited, for the day-by-day life of a missionary. And it is most satisfying – and not seldom amusing – to have the acid Baegert alongside to enrich historian Dunne's lively narrative with firsthand observation of the scene, the climate, the native people, the plants, animals, and products of the peninsula. The dim view Baegert took was fortunately tempered by characteristic haleness of mind and body, complete acceptance of his calling, and unquestioning devotion to the welfare of his Indian charges.

It is a tragic historical accident that medical knowledge was too far behind those times of a sincere and dedicated attempt to put one of the world's most unenlightened areas on the road to civilization. With the fathers came a riffraff soldiery – with that, disease. When Portolá landed, with Serra and the Franciscans, to carry out the expulsion orders, there was but a remnant of the once teeming population to be received in custody. Nevertheless, all honor to the Black Robes for a noble part splendidly played – they and their confreres of other robes were so often the best of New Spain. With Kino and Baegert, Bolton and Dunne, their story has been told, and is highly worth hearing.

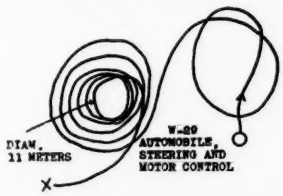
Peter Masten Dunne, S.J., Ph.D., is professor of history in the University of San Francisco and an acknowledged authority on Jesuit mission history. The three books just discussed belong to a University of California Press series on the Jesuit contributions to the cultural history of western North America. Other titles are: *Educational Foundations of the Jesuits in Sixteenth-Century New Spain,* by Jerome V. Jacobsen, S.J., Ph.D. (1938); and *Pioneer Black Robes on the West Coast* (1940), *Pioneer Jesuits in Northern Mexico* (1944), and *Early Jesuit Missions in Tarahumara* (1948), by Peter Masten Dunne.

Interested readers will recall Ira L. Wiggins' review *(PD,* Jan.-Feb. 1952) of another great contemporary Jesuit work – *Sonora: A Description of the Province,* by Ignaz Pfefferkorn (Köln, 1795), published in translation by the University of New Mexico Press (1949). D.G.K.

INFORMATION DESK

STILL PENDING from an earlier issue of *Pacific Discovery* is a question from James H. Barbour as to whether bats, which are said to emerge from Carlsbad Caverns in a counter-clockwise spiral, would spiral in the opposite direction in the southern hemisphere.

Some years ago Asa A. Schaeffer (*Journ. Morphol. & Physiol.*, vol. 45, pp. 293-398. 1928) made an extensive study of spiral movement in man and other organisms. He states that blindfolded persons walk, run, swim, row and drive automobiles (pedestrians please note!) in "clock-spring spiral" paths, which he interprets as "the expression



From Asa A. Schaeffer, *Spiral Movement in Man*, 1928, page 315.

in two dimensions of space of a helical spiral mechanism which seems to exist in all mobile organisms moving in three dimensions of space." He found that "the same person may walk or swim or drive both right-spiral turns and left-spiral turns in different experiments or sometimes in the same experiment, although "either right or left turns predominate in the same individual." He considers the fact that people lost in the woods "go in circles" an expression of this phenomenon.

Schaeffer did not specifically deal with the possible effect of the rotation of the earth, but the fact that he found so much individual variation in direction of turning would tend to discount any idea that the earth's rotation is a causative factor. Of course, he didn't actually study bats, so maybe the question is still open.

From different readers come two questions on heredity that can be answered together:

Is dark skin dominant over white skin? If so, how did white skin come into being? E.E., Redwood City

If curly hair is dominant over straight hair, why is it that when you look over a large audience of people there are so few with curly hair? M.J.C., San Francisco

In human inheritance it is only occasionally possible to find characters that behave as a simple Mendelian pair—one dominant, the other recessive. Generally speaking, we find what is called "blending inheritance"—the characters of the offspring being intermediate between those of the parents. This is well known regarding skin color; and as regards type of hair, we all recognize such categories as kinky, curly, wavy, and straight.

Two parents with straight hair will rarely or never have a curly-haired child. Two curly-haired parents are likely to have curly-haired offspring. In a mating between a curly-haired and a straight-haired, or a curly-haired and a wavy-haired parent, anything can happen. Unfortunately for people who like curly hair, and fortunately for hairdressers who specialize in "permanent waves," curly hair is not a simple dominant.

As to how white skin came into being, the evidence indicates that white-skinned and dark-skinned peoples developed in different parts of the world—the darkest-skinned peoples in tropical regions where they needed pigment to protect them from the sun.

To settle a friendly argument, does a cup of coffee cool faster before or after cream is added, or doesn't it make any difference? V.H., San Francisco

The cooling of a cup of coffee is a highly complicated matter, involving conduction of heat from the liquid to the cup, radiation from the cup and from the surface of the liquid, evaporation at the surface, volume of the liquid (which is increased by adding the cream), and even the color (a "black body" being the ideal radiator). The most important single factor is the *difference* in temperature between the coffee and its surroundings. Accordingly, if you want a cup of coffee to cool rapidly, let it stand a while before the cream is added; if you dawdle over your breakfast and want your coffee to stay warm as long as possible, add the cream immediately.

How many kinds of birds are there in California? F.G.A., Mill Valley

According to the last *Distribution of the Birds of California* (Miller and Grinnell, 1944) there are 427 species of birds in California. If we include subspecies as well, the total number of kinds of birds in the state is 644.

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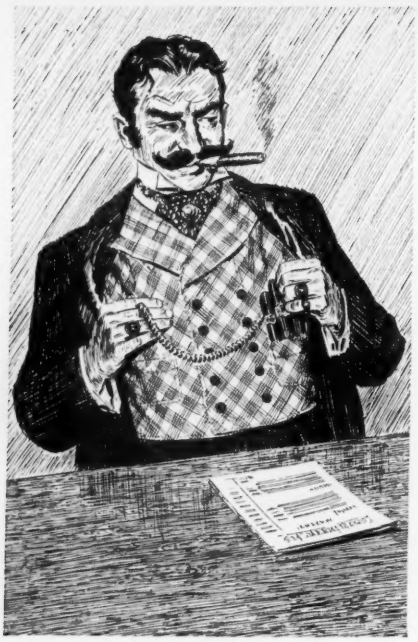

Who really owns Standard?

That old bogeyman—the Tycoon of Big Business—seems still to linger in the minds of some people. Whether or not this was ever a true picture, it is certainly false today. Standard Oil Company of California, for instance, is widely held, independent. It has its own management and shareholders. It is not connected with any of the Standard companies in the East.

The actual owners of Standard Oil Company of California now number 115,942—which is 17,000 more than just two years ago. They include 283 universities and other educational institutions; 236 churches and religious organizations; 1825 small and large businesses; 159 hospitals and other medical groups; 10,876 employees of the Company, and 102,563 other individual citizens, few of whom could be called rich. The great number of our shareholders are people like your own friends and neighbors—yourself, perhaps—mechanics, clerks, farmers, white-collar men, widows, men and women who have retired. ¶ In another sense, of course, the "owners" of Standard are our customers. You *control* the Company by your choice of brands, and you *benefit* by the quality and economy of the products we sell. The only way Standard can look after the interests of its shareholders is by making sure that Standard serves *you* well.

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